Panasonic

PROGRAMMABLE CONTROLLER

GT Series

Technical Manual

ARCT1F398E-9

2009.9 | panasonic-electric-works.net/ac

Panasonic Electric Works

Safety Precautions

Observe the following notices to ensure personal safety or to prevent accidents.
To ensure that you use this product correctly, read this User's Manual thoroughly before use.
Make sure that you fully understand the product and information on safety.
This manual uses two safety flags to indicate different levels of danger.

WARNING

If critical situations that could lead to user's death or serious injury is assumed by mishandling of the product:

-Always take precautions to ensure the overall safety of your system, so that the whole system remains safe in the event of failure of this product or other external factor.
-DO NOT USE THE PROGRAMMABLE DISPLAY TO CONTROL SAFETY FEATURES OR OTHER CRITICAL OPERATIONS OF EQUIPMENT OR SYSTEMS. A COMMUNICATION ERROR (FOR ANY REASON) MIGHT PREVENT SUCH SAFETY FEATURES OR CRITICAL OPERATIONS FROM FUNCTIONING PROPERLY.
-Do not use this product in areas with inflammable gas. It could lead to an explosion.
-Exposing this product to excessive heat or open flames could cause damage to the lithium battery or other electronic parts.
-Battery may explode if mistreated. Do not recharge, disassemble or dispose of fire.

CAUTION

If critical situations that could lead to user's injury or only property damage is assumed by mishandling of the product.

-To prevent excessive exothermic heat or smoke generation, use this product at the values less than the maximum of the characteristics and performance that are assured in these specifications.
-Do not dismantle or remodel the product. It could cause excessive exothermic heat or smoke generation.
-Do not touch the terminal while turning on electricity. It could lead to an electric shock.
-Use the external devices to function the emergency stop and interlock circuit.
-Connect the wires or connectors securely.
The loose connection could cause excessive exothermic heat or smoke generation.
-Do not allow foreign matters such as liquid, flammable materials, metals to go into the inside of the product. It could cause excessive exothermic heat or smoke generation.
-Do not undertake construction (such as connection and disconnection) while the power supply is on. It could lead to an electric shock.
- The control force of the touch switches should be less than the specification of the product. Failure to do so could lead to a damage to the product or a personal injury.
-These touch switches operate using analog resistance membrane. Do not press more than one point on the screen at a time. Doing so might operate a switch located in the middle of the points pressed if one exists, and could lead to a damage to the facility or an accident.
（The GT30 is not included）

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Before You Start

Usage conditions

Operating environment (Use the unit within the range of the general specifications when installing)

- Ambient temperatures: 0 to +50 °C
  (It varies according to models when installing the unit in a horizontal orientation or using a C-NET adapter and FP programmer II.)
- Ambient humidity: 20 to 85% RH (at 25 °C, non-condensing)
- For use in pollution Degree 2 environment
- Do not use it in the following environments.
  - Direct sunlight, wind and rain. (This product is not designed for outdoor use.)
  - Sudden temperature changes causing condensation.
  - Inflammable or corrosive gas.
  - Excessive airborne dust, metal particles or saline matter.
  - Benzine, paint thinner, alcohol or other organic solvents or strong alkaline solutions such as ammonia or caustic soda.
  - Direct vibration, shock or places always exposed to drop of water.
    (This unit is warranted by IP65 (IP67 for GT12) for panel mounting, however, this applies to initial values.)
  - Influence from power transmission lines, high voltage equipment, power cables, power equipment, radio transmitters, or any other equipment that would generate high switching surges. (100 mm or more)

Static electricity

- Do not touch connector pins directly to prevent static electricity from causing damage.
- Always rid yourself of any static electricity before handling this product.
- If excessive estatic electricity is applied to the panel surface, the LCD display unit may be damaged.

Power supply

- Twist the wires of the power supply.
- The unit has sufficient noise immunity against the noise generated on the power line. However, it is recommended to take measures for reducing noise such as using an isolating transformer before supplying the power. And it is recommended to take measures such as installing a ferrite core.
- Allocate an independent wiring for each power supplying line, PLC etc and operating device.
- If using a power supply withoug a protective circuit, power should be supplied through a protective element such as fuse. Directly applying an abnormal voltage to the unit may cause the damage to the internal circuit.

Touch-panel

- Always operate the touch switch with fingers. As the touch switch may be damaged due to the excessive load or shock (caused when being operated with any tools), the touch switch should be operated within the specified control force. Also, if the touch swich is pressed like kneading, the electrode may be worn out exceptionally, and cause the malfunction. Operate with a single touch of the switch.
- Do not drop or have a strong impact on the programmable display unit as glass is used for the LCD panel.
- The liquid in the LCD panel is a hazardous substance. If the LCD panel is broken, do not put the leaked crystalline liquid into your mouse. Should it get into your mouse, immediately gargle, and consult a doctor. If it adheres to your skin or clothes, wash it away with soap.
- There is a case that shadows appear in the place on the screen of the GT where no graphic or part is arranged. (The shadows appear as the extension of the characters, graphics or parts actually being displayed.) This is a phenomenon resulting from the basic characteristics of liquid crystal devices, and called cross talk.

Battery

Do not leave the battery in the unit when it is not used. There is a possibility of leak if it is left being discharged.

Manuals to be Used

- The manuals to be used for GT series are common to all the models.

GT series Technical Manual ARCT1F398E
- It is this manual.

GTWIN Manual ACGM0357VEN**
- It is an operating manual for the tool software to create screens of GT series. It is supplied with the tool software.

General-purpose Serial Communication Manual ARCT1F356E
- It is required when communication is carried out with devices you developed such as a board and PC.

Connection with Other Companies' PLCs Manual ARCT1F449E
It is a manual describing the connection methods with PLCs manufactured by other companies. The connection methods with Panasonic PLCs are described in this manual.

Key Point: - The PDF versions are provided at our website.
http://panasonic-electric-works.net/ac/
(User registration is required. Free of charge)

- GTWIN Manual <ACGM0357VEN> is provided with Screen creation tool software Terminal GTWIN.**

Version of GT and Available Functions

We recommend to keep GT-series products up to date for use as usable functions will increase according to the upgrade.

The latest version of GT can be installed by the tool.
The upgrade of GTWIN is also necessary according to the upgrade of GT.

Reference: How to upgrade the version, <GTWIN Operational Guide Book ARCT1F357E>

Available functions on GT01 and GT versions N/A: Not available

Function	GT01	GTWIN	Remarks
Display panel sideways setting	1.10 or later	2.40 or later	
Line graph	1.00 or later	2.30 or later	
Alarm list and alarm history	N/A	N/A	
Recipe	1.00 or later	2.30 or later	
Password	1.00 or later	2.30 or later	
Flow display	1.00 or later	2.30 or later	
Write device	1.00 or later	2.30 or later	
Data parts:Floating-point scaling	1.00 or later	2.30 or later	
Multiple language exchange	1.20 or later	2.50 or later	
Copy function	1.30 or later	2.71 or later	

Available functions on GT11 and GT versions N/A: Not available

Function	GT11	GTWIN	Remarks
Display panel sideways setting	1.00 or later	2.60 or later	
Line graph	1.00 or later	2.60 or later	
Alarm list and alarm history	1.00 or later	2.60 or later	
Recipe	1.00 or later	2.60 or later	
Password	1.00 or later	2.60 or later	
Flow display	1.00 or later	2.60 or later	
Write device	1.00 or later	2.60 or later	
Data parts:Floating-point scaling	1.00 or later	2.60 or later	
Multiple language exchange	1.00 or later	2.60 or later	
Copy function	1.20 or later	2.71 or later	

Available functions on GT21 and GT versions N/A: Not available

Function	GT21	GTWIN	Remarks
Display panel sideways setting	1.10 or later	2.71 or later	
Line graph	1.00 or later	2.70 or later	
Alarm list and alarm history	1.00 or later	2.70 or later	
Recipe	1.00 or later	2.70 or later	
Password	1.00 or later	2.70 or later	
Flow display	1.00 or later	2.70 or later	
Write device	1.00 or later	2.70 or later	
Data parts:Floating-point scaling	1.00 or later	2.70 or later	
Multiple language exchange	1.00 or later	2.70 or later	
Copy function	N/A	N/A	

Available functions on GT30 and GT versions N/A: Not available

Function	GT30	GTWIN	Remarks
Display panel sideways setting	N/A	N/A	
Line graph	2.00 or later	2.20 or later	
Alarm list and alarm history	2.00 or later	2.20 or later	
Recipe	2.00 or later	2.20 or later	
Password	2.00 or later	2.20 or later	
Flow display	2.00 or later	2.20 or later	
Write device	2.00 or later	2.20 or later	
Data parts:Floating-point scaling	2.00 or later	2.20 or later	
Multiple language exchange	N/A	N/A	
Copy function	N/A	N/A	

Available functions on GT05 and GT versions N/A: Not available

Function	GT05	GTWIN	Remarks
Display panel sideways setting	N/A	N/A	
Line graph	1.00 or later	2.90 or later	
Alarm list and alarm history	1.00 or later	2.90 or later	
Recipe	1.00 or later	2.90 or later	
Password	1.00 or later	2.90 or later	
Operation security	1.10 or later	2.94 or later	
Flow display	1.00 or later	2.90 or later	
Write device	1.00 or later	2.90 or later	
Data parts:Floating-point scaling	1.00 or later	2.90 or later	
Multiple language exchange	1.00 or later	2.90 or later	
Copy function	N/A	N/A	
GT link	1.10 or later	2.94 or later	
PLC multiple connection	1.30 or later	2.97 or later	
"Multi Function" function	1.30 or later	2.97 or later	
Logging function	1.40 or later	2.98 or later	
Index modifier of data parts	1.40 or later	2.98 or later	

Available functions on GT12 and GT versions N/A: Not available

Function	GT12	GTWIN	Remarks
Display panel sideways setting	1.00 or later	2.97 or later	
Line graph	1.00 or later	2.97 or later	
Alarm list and alarm history	1.00 or later	2.97 or later	
Recipe	1.00 or later	2.97 or later	
Password	1.00 or later	2.97 or later	
Operation security	1.00 or later	2.97 or later	
Flow display	1.00 or later	2.97 or later	
Write device	1.00 or later	2.97 or later	
Data parts:Floating-point scaling	1.00 or later	2.97 or later	
Multiple language exchange	1.00 or later	2.97 or later	
Copy function	N/A	N/A	
GT link	1.00 or later	2.97 or later	
PLC multiple connection	1.00 or later	2.97 or later	
"Multi Function" function	1.00 or later	2.97 or later	
Logging function	1.10 or later	2.98 or later	
Index modifier of data parts	1.10 or later	2.98 or later	

Available functions on GT32 and GT versions N/A: Not available

Function	GT32	GTWIN	Remarks
Display panel sideways setting	N/A	N/A	
Line graph	1.00 or later	2.80 or later	
Alarm list and alarm history	1.00 or later	2.80 or later	
Recipe	1.00 or later	2.80 or later	
Password	1.00 or later	2.80 or later	
Operation security	1.20 or later	2.94 or later	
Flow display	1.00 or later	2.80 or later	
Write device	1.00 or later	2.80 or later	
Data parts:Floating-point scaling	1.00 or later	2.80 or later	
Multiple language exchange	1.00 or later	2.80 or later	
Copy function	N/A	N/A	
GT link	1.20 or later	2.94 or later	
PLC multiple connection	1.40 or later	2.97 or later	
"Multi Function" function	1.40 or later	2.97 or later	
Logging function	1.50 or later	2.98 or later	
Index modifier of data parts	1.50 or later	2.98 or later	

Change history

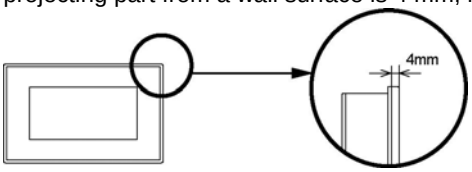
GTWIN version	GT-series version	Additional functions
Ver. 2.80	GT32 Ver. 1.00 (New release)	- Added new functions. - Equipped a SD memory card slot. - Sound function
Ver. 2.90	GT05 Ver. 1.00 (New release)	- Added new functions.
Ver. 2.94	GT05 Ver. 1.10 GT32 Ver. 1.20	- Operation security function - GT link function
Ver. 2.96	GT01 Ver. 1.35 GT05 Ver. 1.20 GT11 Ver. 1.25 GT21 Ver. 1.15 GT32 Ver. 1.30	- Touch sound disable flag in Basic communication area (Bit area)
Ver. 2.97	GT05 Ver. 1.30 GT12 Ver. 1.00 (New release) GT32 Ver. 1.40	- Added new functions. - "Mult Function" function - PLC multiple connection - Display/Hide of data parts - Modbus slave function - Added 4096-color parts library.
Ver. 2.98	GT05 Ver. 1.40 GT12 Ver. 1.10 GT32 Ver. 1.50	- Logging function - Index modifier of data parts - Display/Hide of switch parts - Display of data parts in kana and Chinese character, - kana input of keyboard parts･Unit number setting on GT when using General-purpose serial - SD memory card copy to password-protected GT - Connection between multiple units with Modbus(RTU) master - Output to Panasonic FP series "X" device. - Jump to the prvious screen from "Screen No. Error" screen - Reverse display function
	GT01 Ver. 1.37 GT11 Ver. 1.27	- Jump to the prvious screen from "Screen No. Error" screen - Reverse display function

Chapter 1

Features and Functions

1.1 Features and Functions of GT Series

Can be installed in a small space.
As the GT series is a small and thin-shaped body, it can be installed in a small space. Also, as the projecting part from a wall surface is 4 mm, it looks neat after installation.



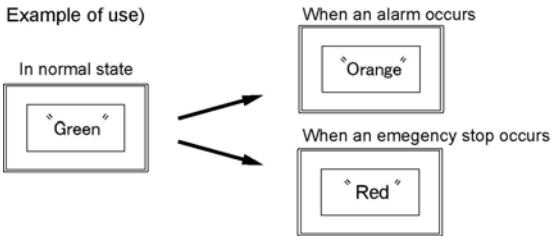
The GT01, GT11, GT12 and GT21 can be installed in vertical orientation.

Number of colors can be selected as usage.

GT series	Number of colors
GT21C	256 colors
GT30C	16 colors
GT32T0/GT32T1/GT05S	4096 colors

Monochrome 8 gradation display function is available. (GT12)
The monochrome 8-gradation display can be selected as well as the existing monochrome 2-gradation display, so that the screen can be displayed finely.

Easily shows a current state changing the backlight on the monochrome type.
For the monochrome type (3-color LED backlight type), changing in the backlight color makes it easy to grasp a current state at a glance.
"Green, orange, red" type and "White, red, pink" type is available for the 3-color LED backlight type.



Analog touch panel provided (except GT30))
As an analog touch panel is provided, it allows maximum flexibility in the switch layout and size.

Screens can be created easily, using a special screen creation tool Terminal GTWIN.
Screen contents can be easily created using the dedicated Terminal GTWIN tool. Screens are put together simply by selecting parts from libraries and positioning them in place.
Various parts for numerous applications are provided such as 256-color 3D parts.

Screen data of the other models can be used with the model conversion function.
Screen data can be converted from the low-resolution model to high-resolution model, e.g. from GT01 to GT11, from GT21 to GT32.

The communication methods support RS232C/RS422 (RS485)
The communication methods to PLCs support RS232C/RS422(RS485). Also it can be connected to PLCs manufactured by other companies.

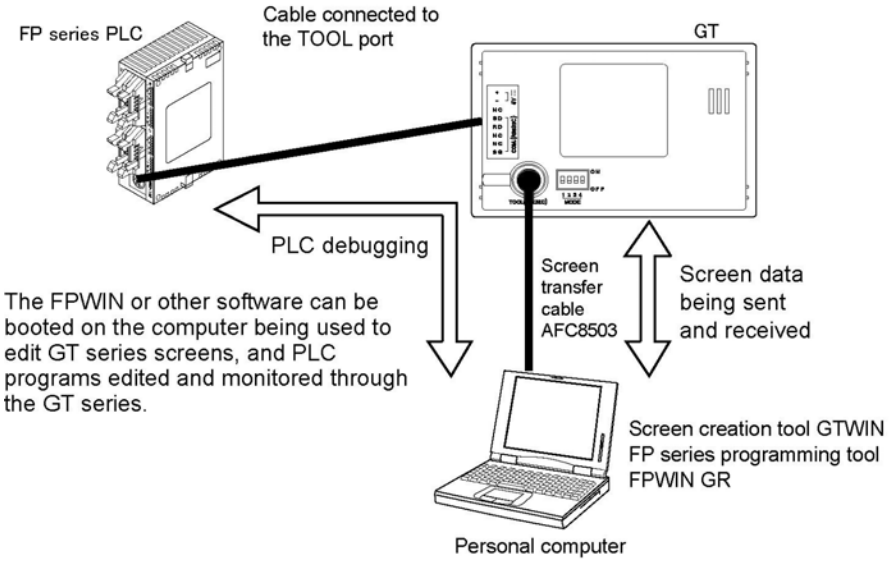
Structure adapted to surrounding environments
IP65. It has a dust-proof, waterproof and drop-proof structure. (IP67 for GT12)

High-intensity LED provided (LED backlight type)
As the high-intensity LED is provided, the screen is bright, and the backlight does not need to be replaced.

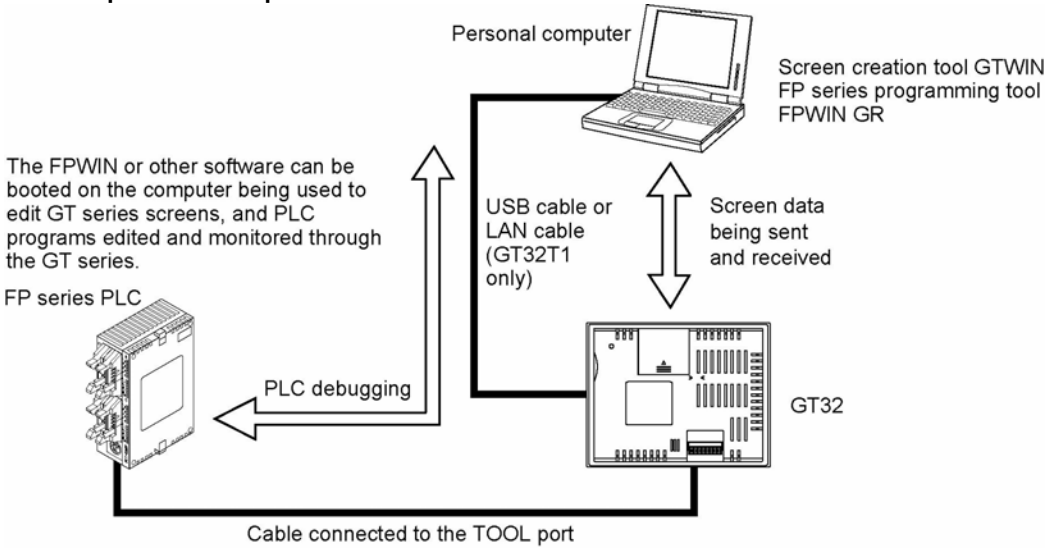
Through function is convenient for debugging

A convenient “through” function makes it possible to transfer data from the GT and carry out PLC debugging at the same time that communication is going on between the GT and the FP series PLC. This significantly boosts efficiency in the workplace.

For TOOL port models



For USB port/Ethernet port models



New functions can be available by upgrading the GT. (except GT30)

The GT can be easily upgraded by donwloading the latest firmware from our website or using the GT Ver_UP tool.

Security Function

- Password protection function

A password (max. 8 characters) is specified for trasferring the screen data to GT from GTWIN. This function prevents the outflow of screen data if anyone except the administrator tries to read out the screen data.

- Operation security function (GT05, GT12, GT32)

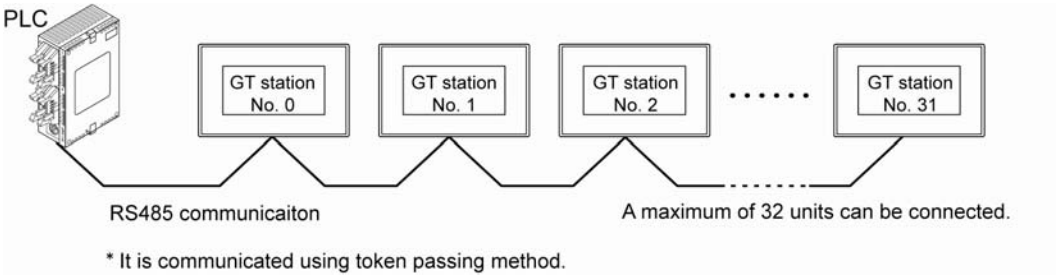
This function is used to limit the contents of displays and operations by setting the security level of users for each part.

The level of operators are managed with the security password.

GT link function (GT05, GT12, GT32)

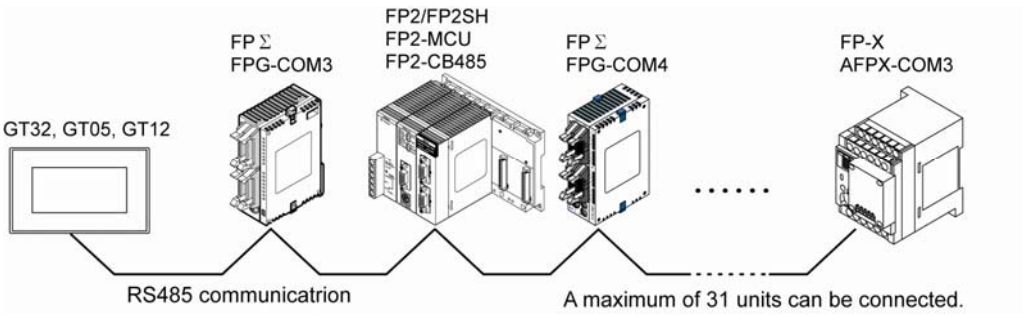
This function is used to connect multiple GT units (up to 32 units) to a single PLC (Panasonic FP series). RS485 communication is used.

Note) Station numbers should be set to the connected GT units. The both settings for GT and PLC are necessary.



PLC Multiple Connection (GT05, GT12, GT32)

This is a function that enables multiple Panasonic PLCs (FP series) (up to 31 units) to be connected with one GT. Communication is performed via RS485.

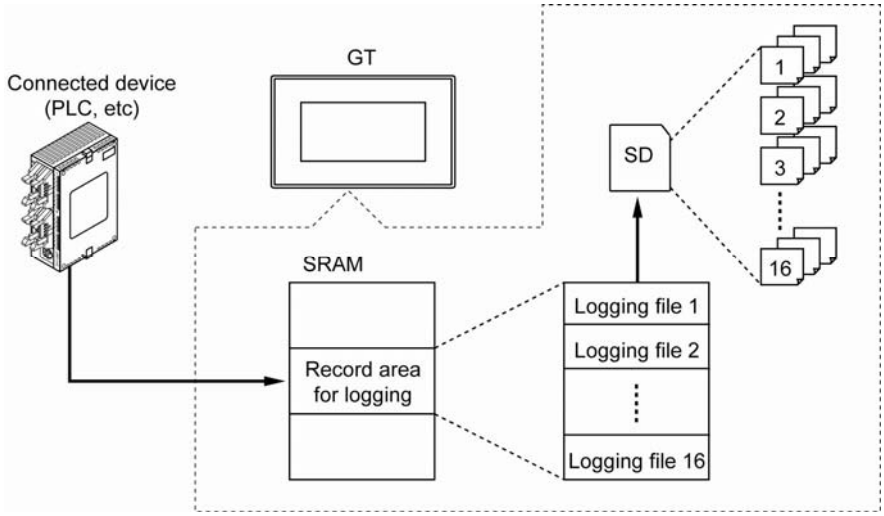


Logging function (GT05, GT12, GT32)

It is a function to collect and log arbitrary device values into a PLC at a constant period or when conditions are met.

Logged data is saved in a SD memory card inserted in this unit in CSV format.

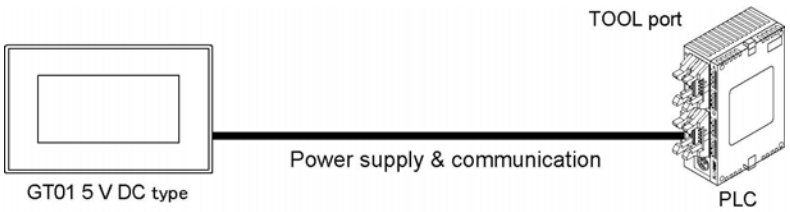
This function is useful for obtaining the history of data.



1.2 About Power Supply for GT01 5 V DC Type

Power can be supplied to the GT01 5 V type with only one communication cable.

The power is supplied from the TOOL port of a PLC, therefore, the wiring man-hours can be significantly reduced.



Applicable models:

Panasonic FP series

Mitsubishi Electric Corporation FX series

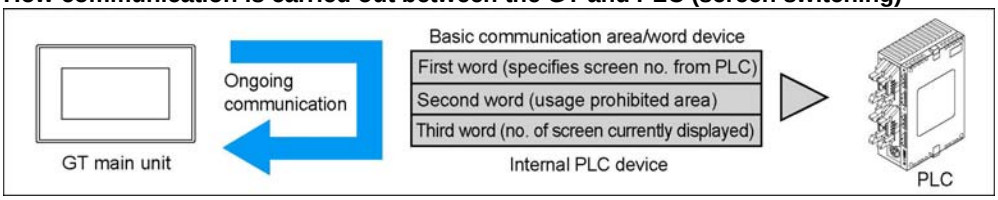
1.3 How to Switch Screens

There are three ways to switch screens registered in the GT.

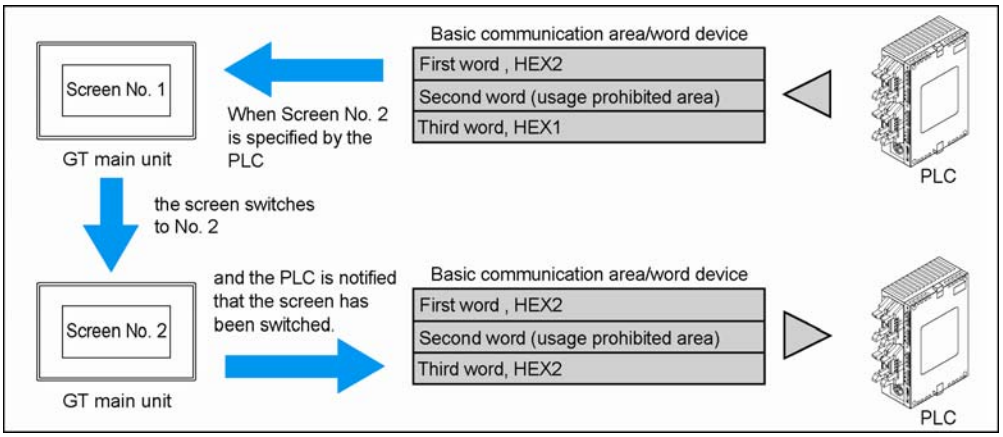
1.3.1 Setting from PLC Ladder Program

The screens can be switched by writing to the “basic communication area” from the PLC ladder program.

How communication is carried out between the GT and PLC (screen switching)



How screens are switched

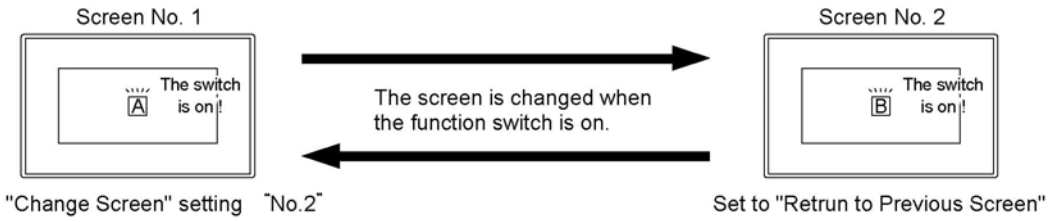


1.3.2 Setting Function Switching Parts by GTWIN

The screens can be switched on the GT by using the “function switching parts” provided in the parts library of the GTWIN that has a function to switch the screens.
These parts should be arranged on the base screen and assigned the attributes indicated below.

Using the “Change Screen” operation mode

The screen number to be changed can be specified for the function switch by selecting the “Change screen” operation mode. Press the switch part to switch the screen to the specified screen.
To return to the screen displayed just prior to the currently displayed screen, the “Return to Previous Screen” operation mode can be used.

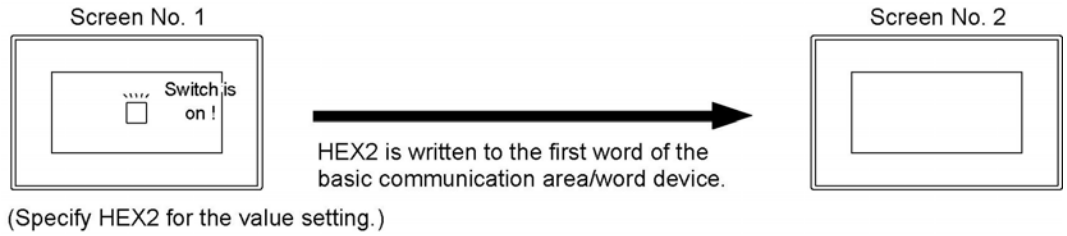


Using the “Value Set” operation mode

Select the “Value Set” operation mode and enter the following settings:

- Data format : Specify 1 word
- Output destination : Specify to first word of basic communication area/word device
- Value : Number of screen to be changed to (hexadecimal specification)

Each time the GT switch part is pressed, the screen number is forcibly written by the GT to the first word of the basic communication area/word device, and the screen is switched.

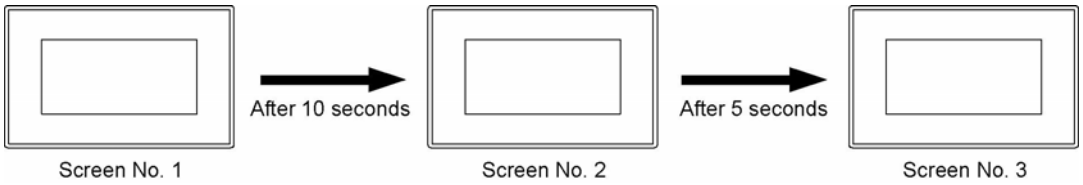


Reference: <GTWIN Manual ACGM0357V**EN> <GTWIN HELP>

1.3.3 Setting Auto-paging Function by GTWIN

The GT man unit has an “Auto-paging” function in the configuration setting that automatically switches the screen to a specified screen number when a certain period of time has elapsed. This function can be used to switch screens automatically.

(1) The screen number 1 is changed to the screen number 2 after 10 seconds.
(2) The screen number 2 is changed to the screen number 3 after 5 seconds.



Reference: <5.4.2 Auto-Paging>

1.4 Types of GT Series

1.4.1 GT Series

Item name	Model	Display	Specifi-cations	Backlight	Power supply	Commu-nication port	Body color	Model No.
GT01	GT01	STN monochrome LCD (128x64 dots)	TOOL port (RS232C compliant)	3-color LED (green, red, orange)	5 V DC	RS232C	Black	AIGT0030B1
							Ashgray	AIGT0030H1
						RS422 (RS485)	Black	AIGT0032B1
							Ashgray	AIGT0032H1
					24 V DC	RS232C	Black	AIGT0030B
							Ashgray	AIGT0030H
						RS422 (RS485)	Black	AIGT0032B
							Ashgray	AIGT0032H
				1-color LED (white)	5 V DC	RS232C	Black	AIGT0130B1
							Ashgray	AIGT0130H1
						RS422 (RS485)	Black	AIGT0132B1
							Ashgray	AIGT0132H1
					24 V DC	RS232C	Black	AIGT0130B
							Ashgray	AIGT0130H
						RS422 (RS485)	Black	AIGT0132B
							Ashgray	AIGT0132H
	GT01R			3-color LED (white, red, pink)	5 V DC	RS232C	Pure black	AIGT0230B1
							Silver	AIGT0230H1
						RS422 (RS485)	Pure black	AIGT0232B1
							Silver	AIGT0232H1
					24 V DC	RS232C	Pure black	AIGT0230B
							Silver	AIGT0230H
						RS422 (RS485)	Pure black	AIGT0232B
							Silver	AIGT0232H
GT05	GT05M	STN monochrome LCD (320x240 dots)	USB port (USB1.1 compliant) with SD memory card slot	3-color LED (white, red, pink)	24 V DC	RS232C	Pure black	AIG05MQ02D
							Silver	AIG05MQ03D
						RS422 (RS485)	Pure black	AIG05MQ04D
							Silver	AIG05MQ05D
	GT05G			3-color LED (green, red, orange)		RS232C	Pure black	AIG05GQ02D
							Silver	AIG05GQ03D
						RS422 (RS485)	Pure black	AIG05GQ04D
							Silver	AIG05GQ05D
	GT05S	4096-color STN color LCD (320x240 dots)		1-color LED (white)		RS232C	Pure black	AIG05SQ02D
							Silver	AIG05SQ03D
						RS422 (RS485)	Black	AIG05SQ04D
							Ashgray	AIG05SQ05D
GT11	GT11	STN monochrome LCD (240x96 dots)	TOOL port (RS232C compliant)	3-color LED (green,red, orange)	24 V DC	RS232C	Black	AIGT2030B
							Ashgray	AIGT2030H
						RS422 (RS485)	Black	AIGT2032B
							Ashgray	AIGT2032H
				1-color LED (white)		RS232C	Black	AIGT2130B
							Ashgray	AIGT2130H
						RS422 (RS485)	Black	AIGT2132B
							Ashgray	AIGT2132H
GT12	GT12M1	STN monochrome LCD (320x120 dots)	USB port (USB1.1 compliant) with SD memory card slot	3-color LED (white, red, pink)	24 V DC	RS232C	Pure black	AIG12MQ12D
							Silver	AIG12MQ13D
						RS422 (RS485)	Pure black	AIG12MQ14D
							Silver	AIG12MQ15D
	GT12G1			3-color LED (green, red, orange)		RS232C	Pure black	AIG12GQ12D
							Silver	AIG12GQ13D
						RS422 (RS485)	Pure black	AIG12GQ14D
							Silver	AIG12GQ15D

Item name	Model	Display	Specifications	Back-light	Power supply	Commu-nication port	Body color	Model No.
GT21	GT21	256-color STN color LCD (320x240 dots)	TOOL port (RS232C compliant)	1-color LED (white)	5 V DC	RS232C	Pure black	AIGT2230B
							Silver	AIGT2230H
						RS422 (RS485)	Pure black	AIGT2232B
							Silver	AIGT2232H
GT30 Note)	GT30M	STN mono-chrome LCD (320x240 dots)	TOOL port (RS232C compliant)	CFL	24 V DC	RS232C	Black	AIGT3100B
							Ashgray	AIGT3100H
	GT30C	16-color STN color LCD (320x240 dots)					Black	AIGT3300B
							Ashgray	AIGT3300H
GT32	GT32M	STN mono-chrome LCD (320x240 dots)	USB port (USB1.1 compliant) with SD memory card slot	CFL	24 V DC	RS232C	Pure black	AIG32MQ02D
							Silver	AIG32MQ03D
						RS422 (RS485)	Pure black	AIG32MQ04D
							Silver	AIG32MQ05D
	GT32T0	4096-color TFT color LCD (320x240 dots)				RS232C	Pure black	AIG32TQ02D
							Silver	AIG32TQ03D
						RS422 (RS485)	Pure black	AIG32TQ04D
							Silver	AIG32TQ05D
	GT32T1		USB port (USB1.1 compliant) Ethernet port with SD memory card slot with sound output jack			RS232C	Pure black	AIG32TQ12D
							Silver	AIG32TQ13D
						RS422 (RS485)	Pure black	AIG32TQ14D
							Silver	AIG32TQ15D

Note) A battery is supplied with the main unit.

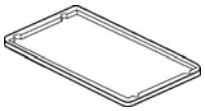
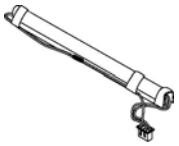
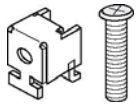
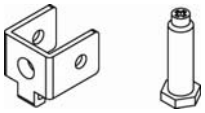
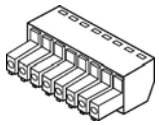
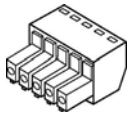
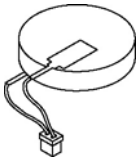
1.4.2 Options

PLC connecting cables

Item name	Contents		Product No.
	For connection between GT01 (5V DC/RS232C) and our FP-series TOOL port Mini-DIN 5-pin loose-wire cable * A ferrite core is supplied with the main unit.	2 m	AIGT8142
	For connection between GT01 (5V DC/RS422) and MITSUBISHI FX-series TOOL port Mini-DIN 8-pin loose-wire cable * A ferrite core is supplied with the main unit.	2 m	AIGT8152
	For connection between 24V DC type and our FP-series TOOL port Mini-DIN 5-pin loose-wire cable	2 m	AIGT8162
		5 m	AIGT8165
		10 m	AIGT8160
	For connection between 24V DC type and MITSUBISHI FX-series TOOL port Mini-DIN 8-pin loose-wire cable	5 m	AIGT8175
	For connection betweenGT10, GT30 and our FP-series TOOL port Mini-DIN 5-pin loose-wire cable	2 m	AIGT8192
	For connection to COM port of FP2/FP2SH and FP2 computer communication unit D-SUB 9-pin loose-wire cable	2 m	AIP81842

Note:

- About the connection to the COM ports of FPΣ and FP0
  As the connection to the COM port of FPΣ and FP0 is a loose-wire connection, a cable is not provided.

Item name		Contents				Product No.
Front panel protective sheet		GT01	For GT01	Sold separately	10 in set	AIGT080
			For GT01R			AIGT080R
		For GT05				AIG05800
		For GT11				AIGT280
		For GT12				AIG12800
		For GT21				AIGT28021
		For GT30		For repair		AIGT380
		For GT32		Sold separately		AIGT32800
Waterproof packing		For GT01		For repair	10 in set	AIGT081
		For GT05				AIG05810
		For GT11				AIGT181
		For GT12				AIG2810
		For GT21				AIGT28121
		For GT30				AIGT381
		For GT32				AIG32810
Replacement backlight		For GT30			1 pc	AIGT382
Attachment fittings		GT01/GT11 repair (4 pc/set)			5 sets	AIGT083
		For GT05/GT21 repair (2 pc/set)			5 sets	AIGT28321
		For GT30 repair (2 pc/set)			5 sets	AIGT383
		For GT32 repair (2 pc/set)			5 sets	AIG32830
Attachment fittings (with dedicated screws)		For GT12 repair (4 pc each/set)			5 sets	AIG12830
Connector		COM port connector for repair (8-pin)			5 in set	AIGT084
		For GT30 repair COM port connector (5-pin)			5 in set	AIGT184
Backup battery		Backup battery for GT05/GT12/GT32			1 pc	AFPX-BATT

1.5 Screen Creation Tool

1.5.1 Tools Required for Screen Creation

1. Tool software

It can be used for all the models in the GT series.

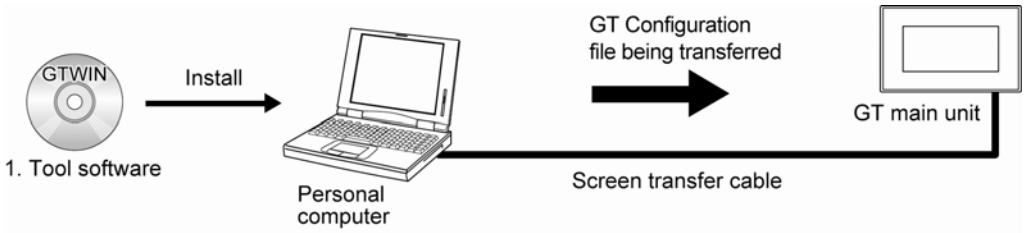
2. Screen transfer cable (Cable for connecting a PC)

For GT01, GT11, GT21 and GT30:

A cable between a PC (D-sub 9-pin) and GT (TOOL port) is available.

For GT32, GT05 and GT12:

Prepare a commercal USB cable or LAN cable (for GT32T1 only).



1.5.2 Software Usage Environment and Applicable Cables

Screen creation tool software Terminal GTWIN Ver. 2

Software type		Required OS	Hard disk capacity	Product No.
Terminal GTWIN Ver. 2 English-language version	Tool	Windows Vista® Windows® 2000 Windows® XP	300 MB or more	AIGT8001V2
	Upgrade			AIGT8001V2R

Note1) GTWIN Manual is provided together with the terminal GTWIN English-language version.

Note2) The latest version is provided free of charge via our website (http://panasonic-electric-works.net/ac). (User registration is required. Free of charge)

Related software (Freeware)

Item name	Contents
Configurator WD IP address search tool	Address setting for the GT in Ethernet communication

Note) It can be downloaded from our website (http://panasonic-electric-works.net/ac). (User registration is required. Free of charge)

Screen transfer cable

For connection between PC (RS232C) and TOOL port (GT01/GT11/GT21/GT30) (RS232C)

Type of PC	PC side connector	GT side connector	Specifications	Product No.
DOS/V machine	D-sub 9-pin	Mini DIN round 5-pin	L type (3 m)	AFC8503
		Mini DIN round 5-pin	Straight type (3 m)	AFC8503S

Note) A USB/RS232C conversion cable is necessary to connect with a personal computer without a serial port using a PC connection cable.

For connection between PC (USB) and USB port (GT05/GT32)

USB cable

Use a commercial cable.

Cable type	Length	Applicable GTWIN version
USB2.0 (or 1.1) AB type	Max. 5 m	Ver. 2.80 or later

Reference: <2.3 Connecting to Screen Creation Tool GTWIN>

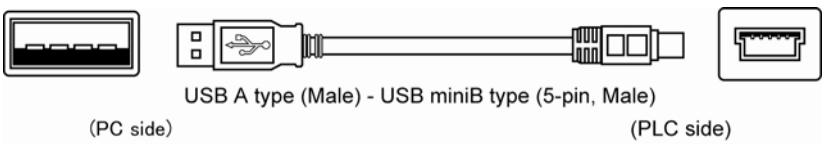
For connection between PC (USB) and USB port (GT12)

USB cable

Use a commercial cable.

Cable type	Length	Applicable GTWIN version
USB2.0 (or 1.1) (A: miniB)	Max. 5 m	Ver. 2.97 or later

Note) Windows®2000 or later OS is required for the communication with a USB.



LAN cable (Ethernet port) (GT32T1)

Either straight cable or crossing cable can be used.
(MDI/MDI-X Automatic crossover function)

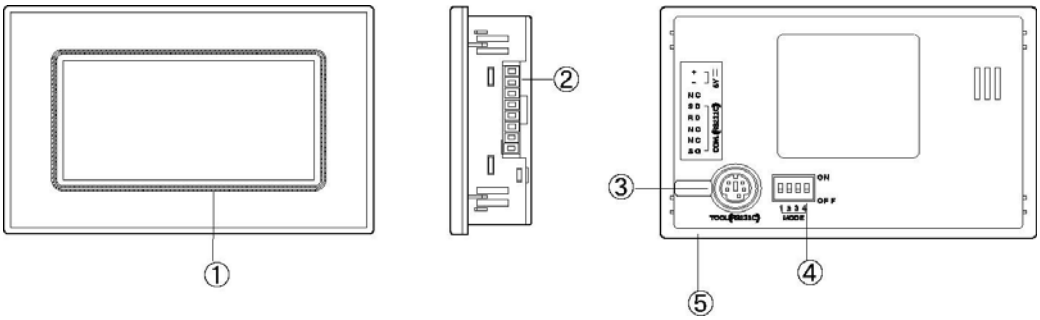
Chapter 2

Names and Functions of Parts

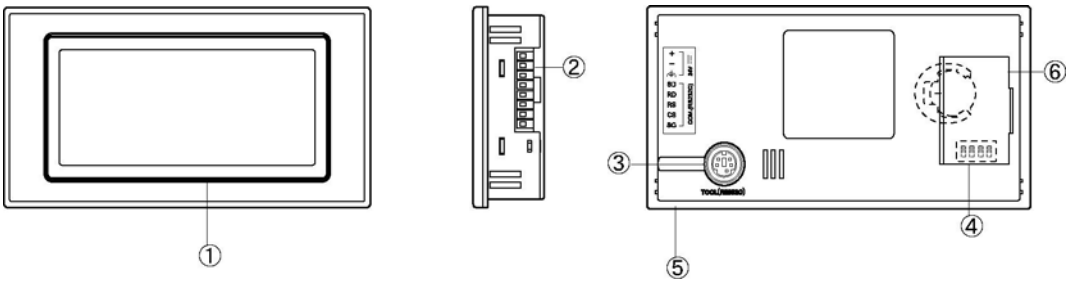
2.1 Part Names

2.1.1 GT01, GT11 and GT21

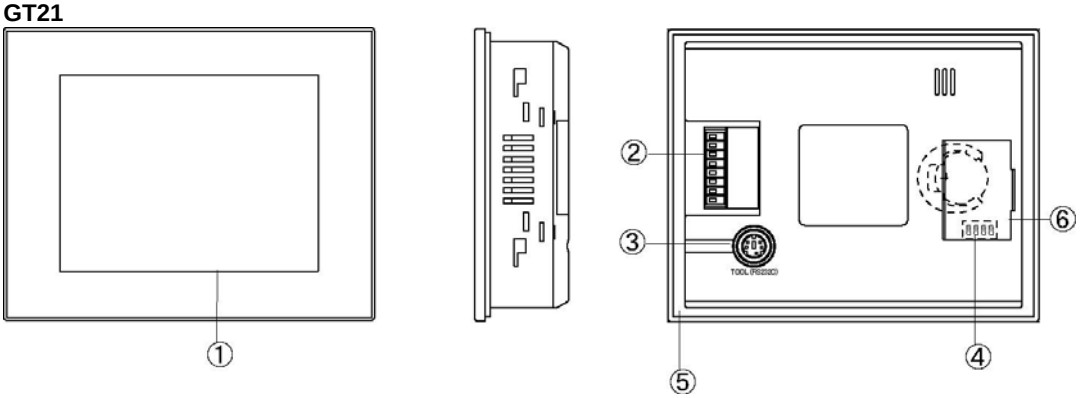
GT01/GT01R



GT11



GT21



① **Touch screen**

Various screens are displayed here. Switches can be operated and data entered simply by touching the touch screen.

(A sheet is affixed to the touch panel to protect it from scratches when shipping. Please remove it before using the GT.)

Optional protective sheets are available to protect the touch screen surface and keep it clean.

Reference: <1.4.2 Options>

② **COM port and power supply terminal**

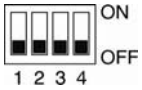
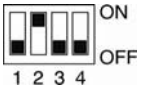
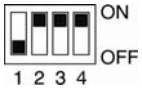
This is a communication port (RS232C or RS422) for connecting to a PLC, host PC, or microcomputer board, and a power supply terminal for operation.

③ **TOOL port (GTWIN connection port)**

This port is used to connect the screen creation tool.

④ **Operation mode setting switches**

Setting the operation mode setting switches as follows when turning on the power supply enables the setting to inhibit to move to the system menu or enables to clear F-ROM.

Setting	Normal use (Factory default)	Inhibit system menu shift	Clear F-ROM
Switch setting			

Note: Do not use any settings other than the above settings.

⑤ **Waterproof packing**

This assures that the front panel is waterproof.

⑥ **Battery cover (for GT11 and GT21)**

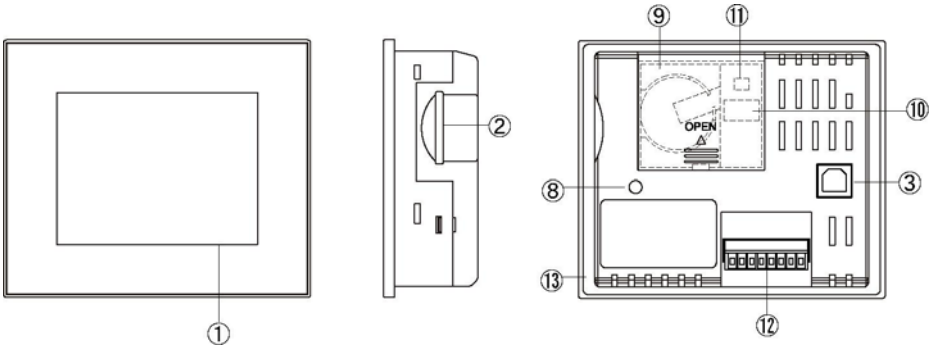
When using a backup battery to be separately purchased, open this battery cover to install it.

The clock, PLC device hold data, alarm history and GT internal device hold data functions can be used with the backup battery.

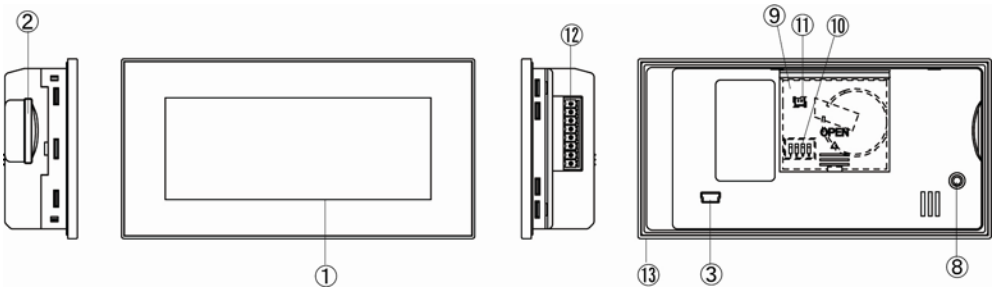
Reference: <3.6.2 How to Install the Battery (GT11 and GT21)>

2.1.2 GT05/GT12/GT32

GT05

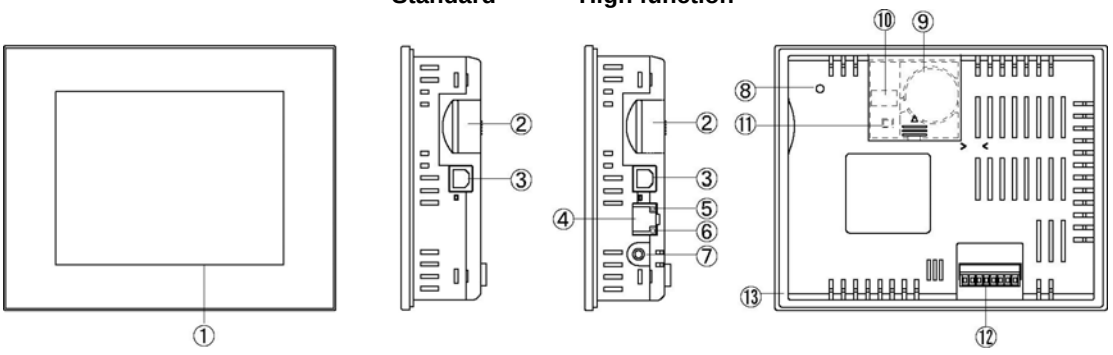


GT12



GT32

Standard **High function**



① **Liquid crystal display panel/touch panel**

Various screens are displayed here. A touch panel is provided on the liquid crystal display panel, and switches can be operated and data entered simply by touching the panel.
Optional protective sheets are also available to protect the touch panel and keep it clean.
(A sheet is affixed to the touch panel to protect it from scratches when shipping. Please remove it before using the GT.)

Reference: <1.4.2 Options>

② **SD memory card slot**

A SD memory card is inserted in this slot.

Note:

- Saving from GTWIN: Operate on the GTWIN screen using a SD memory card read/writer.
- Savving from GT main unit: Operate on the SD memory card setting screen under the system menu.

Reference: <5.3.8 Setting Mode “SD Memory Card”>

③ **USB port**

This is a connector for connecting the screen creation tool. The commercal USB cable can be used.

④ **Ethernet port (RJ45) (GT32T1)**

This is a connector for connecting the screen creation tool. The maximum baud rate is 115200 bps when using Ethernet.

⑤ **SPEED lamp (GT32T1)**

It shows the baud rate when using Ethernet.
Light on: During 100Base communication
Blinking: During 10Base communication

⑥ **LINK/ACT lamp (GT32T1)**

it shows the state of communciation with Ethernet.
Light on: When linked
Blinking: While data reception

⑦ **Sound output jack (GT32T1)**

Insert the speaker with a ϕ 3.5-mini plug amplifier for using the audio output function.

⑧ **SD memory access lamp**

The lamp turns on while accessing a SD memory card.

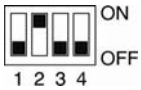
⑨ **Battery cover**

When using a backup battery to be separately purchased, open this battery cover to install it.
The clock, PLC device hold data, alarm history and GT internal device hold data functions can be used with the backup battery.

Reference: <3.6.4 How to Install the Battery>

⑩ **Operation mode setting switches**

Setting the operation mode setting switches as follows when turning on the power supply enables the setting to inhibit to move to the system menu or enables to clear F-ROM.

Setting	Normal use (Factory default)	Inhibit system menu shift	Clear F-ROM
Switch setting			

Note: Do not use any settings other than the above settings.

⑪ **Mounting location of connector for battery**

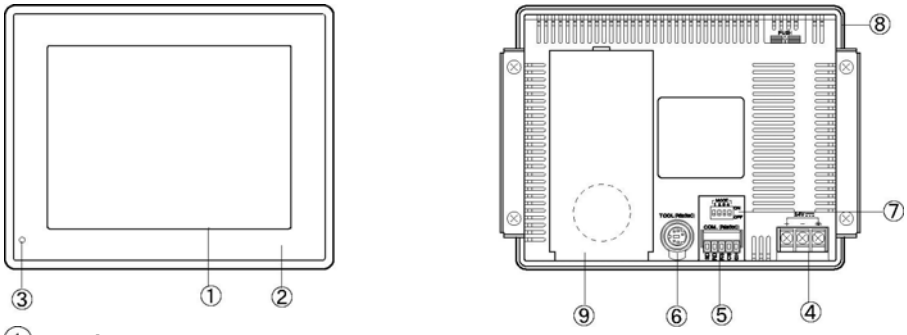
⑫ **COM port (PLC/external device connection port) and power supply terminal**

This is a communication port (RS232C or RS422) for connecting to a PLC, host PC, or microcomputer board, and a power supply terminal for operation.

⑬ **Waterproof packing**

This assures that the front panel is waterproof.

2.1.3 GT30



① Touch screen
Various screens are displayed here. Switches can be operated and data entered simply by touching the touch screen.

② Front panel protective sheet
This protects the touch screen surface and keeps it clean.

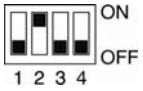
③ Power lamp
The light is on when the power supply is turned on.

④ Power supply terminal
The operation power supply is connected here.

⑤ COM port
This is a RS232C port for connecting to a PLC, host PC, or microcomputer board.

⑥ TOOL port (GTWIN connection port)
This port is used to connect the screen creation.

⑦ Operation mode setting switches
Setting the operation mode setting switches as follows when turning on the power supply enables the setting to inhibit to move to the system menu or enables to clear F-ROM.

Setting	Normal use (Factory default)	Inhibit system menu shift	Clear F-ROM
Switch setting			

Note: Do not use any settings other than the above settings.

⑧ Waterproof packing
This assures that the front panel is waterproof.

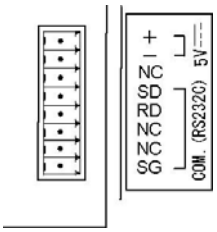
⑨ Battery holder
Although a battery has been installed, an insulation sheet is inserted to prevent the battery discharging. Remove the sheet before using the unit.
The clock, PLC device hold data, alarm history and GT internal device hold data functions can be used with the backup battery.

Reference: <3.6.3 How to Install the Battery (GT30)>

2.2 Terminal Layouts of COM Port

2.2.1 GT01

5 V/RS232C type

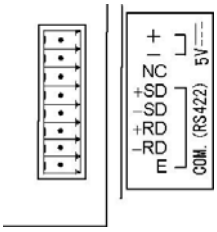


Pin name	Name	Signal direction	Product No.
+	+5 V	-	AIGT0030B1 AIGT0030H1 AIGT0130B1 AIGT0130H1 AIGT0230B1 AIGT0230H1
–	0 V	-	
NC	Not connected	-	
SD	Send data	GT→External device	
RD	Receive data	GT←External device	
NC	Not connected	-	
NC	Not connected	-	
SG	Signal ground	-	

Note:

- There is no RS and CS (control lines).

5 V/RS422(RS485) type

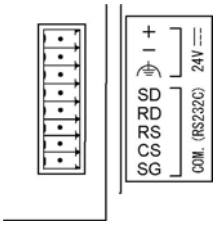


Pin name	Name	Signal direction	Product No.
+	+5 V	-	AIGT0032B1 AIGT0032H1 AIGT0132B1 AIGT0132H1 AIGT0232B1 AIGT0232H1
–	0 V	-	
NC	Not connected	-	
+SD	Send data	GT→External device(+)	
–SD	Send data	GT→External device(–)	
+RD	Receive data	GT←External device(+)	
–RD	Receive data	GT←External device(–)	
E	Terminal resistance	-	

Note:

- There is no RS and CS (control lines).

24 V/RS232C type

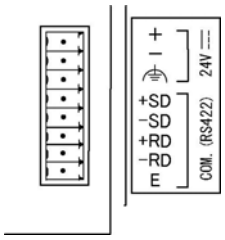


Pin name	Name	Signal direction	Product No.
+	+24 V	-	AIGT0030B AIGT0030H AIGT0130B AIGT0130H AIGT0230B AIGT0230H
–	0 V	-	
FG	Functional ground	-	
SD	Send data	GT→External device	
RD	Receive data	GT←External device	
NC	Not connected	-	
NC	Not connected	-	
SG	Signal ground	-	

Note:

- There is no RS and CS (control lines).

24 V/RS422(RS485) type



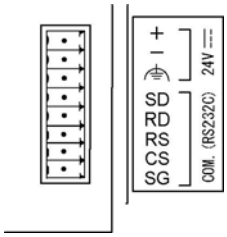
Pin name	Name	Signal direction	Product No.
+	+24 V	-	AIGT0032B AIGT0032H AIGT0132B AIGT0132H AIGT0232B AIGT0232H
–	0 V	-	
FG	Functional ground	-	
+SD	Send data	GT→External device(+)	
–SD	Send data	GT→External device(–)	
+RD	Receive data	GT←External device(+)	
–RD	Receive data	GT←External device(–)	
E	Terminal resistance	-	

Note:

- There is no RS and CS (control lines).
- E is used to set the terminal unit.

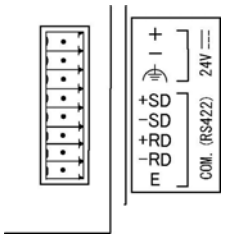
2.2.2 GT11/GT12

24 V/RS232C type



Pin name	Name	Signal direction	Product No.
+	+24 V	-	AIGT2030B AIGT2030H AIGT2130B AIGT2130H
–	0 V	-	
FG	Functional ground	-	
SD	Send data	GT→External device	
RD	Receive data	GT←External device	
RS	Request to send	GT→External device	
CS	Clear to send	GT←External device	
SG	Signal ground	-	

24 V/RS422(RS485) type



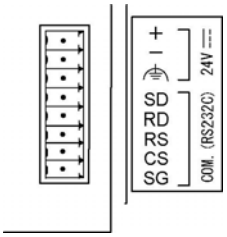
Pin name	Name	Signal direction	Product No.
+	+24 V	-	AIGT2032B AIGT2032H AIGT2132B AIGT2132H
–	0 V	-	
FG	Functional ground	-	
+SD	Send data	GT→External device(+)	
–SD	Send data	GT→External device(–)	
+RD	Receive data	GT←External device(+)	
–RD	Receive data	GT←External device(–)	
E	Terminal resistance	-	

Note:

- There is no RS and CS (control lines).

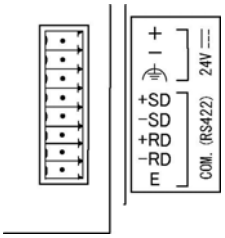
2.2.3 GT21

24 V/RS232C type



Pin name	Name	Signal direction	Product No.
+	+24 V	-	AIGT2230B AIGT2230H
–	0 V	-	
FG	Functional ground	-	
SD	Send data	GT→External device	
RD	Receive data	GT←External device	
RS	Request to send	GT→External device	
CS	Clear to send	GT←External device	
SG	Signal ground	-	

24 V/RS422(RS485) type

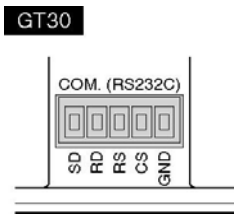


Pin name	Name	Signal direction	Product No.
+	+24 V	-	AIGT2232B AIGT2232H
–	0 V	-	
FG	Functional ground	-	
+SD	Send data	GT→External device(+)	
–SD	Send data	GT→External device(–)	
+RD	Receive data	GT←External device(+)	
–RD	Receive data	GT←External device(–)	
E	Terminal resistance	-	

Note:

- There is no RS and CS (control lines).

2.2.4 GT30



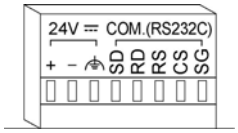
Pin name	Name	Signal direction	Product No.
SD	Send data	GT→External device	AIGT3100B AIGT3100H AIGT3300B AIGT3300H
RD	Receive data	GT←External device	
RS	Request to send	GT→External device	
CS	Clear to send	GT←External device	
GND	Signal ground	-	

Note:

- When connecting the unit to the FP series, there is no need to wire both the RS and CS.

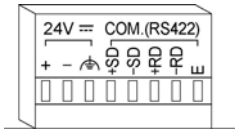
2.2.5 GT05/GT32

24 V/RS232C type



Pin name	Name	Signal direction	Product No.
+	+24 V	-	AIG05MQ02D AIG05MQ03D AIG05GQ02D AIG05GQ03D AIG05SQ02D AIG05SQ03D AIG32MQ02D AIG32MQ03D AIG32TQ02D AIG32TQ03D AIG32TQ12D AIG32TQ13D
–	0 V	-	
FG	Functional ground	-	
SD	Send data	GT→External device	
RD	Receive data	GT←External device	
RS	Request to send	GT→External device	
CS	Clear to send	GT←External device	
SG	Signal ground	-	

24 V/RS422(RS485) type



Pin name	Name	Signal direction	Product No.
+	+24 V	-	AIG05MQ04D AIG05MQ05D AIG05GQ04D AIG05GQ05D AIG05SQ04D AIG05SQ05D AIG32MQ04D AIG32MQ05D AIG32TQ04D AIG32TQ05D AIG32TQ14D AIG32TQ15D
–	0 V	-	
FG	Functional ground	-	
+SD	Send data	GT→External device(+)	
–SD	Send data	GT→External device(–)	
+RD	Receive data	GT←External device(+)	
–RD	Receive data	GT←External device(–)	
E	Terminal resistance	-	

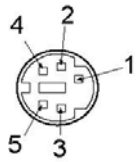
Note:

There is no RS and CS (control lines).

2.3 Connecting to Screen Creation Tool GTWIN

Reference: For information on required items for connection,
<1.5.2 Software Usage Environment and Applicable Cables>

2.3.1 TOOL Port



Pin No.	Name	Abbre.	Signal direction
1	Signal ground	SG	-
2	Send data	SD	GT→External device
3	Receive data	RD	GT←External device
4	Not connected	N.C.	-
5	+5 V	(+5V)	-

Note:

- The +5V of Pin 5 is reserved for the FP Programmer II. It should not be used for any other application. If using it, there is a restriction on the ambient temperature. The pin 5 of GT01 is N.C.

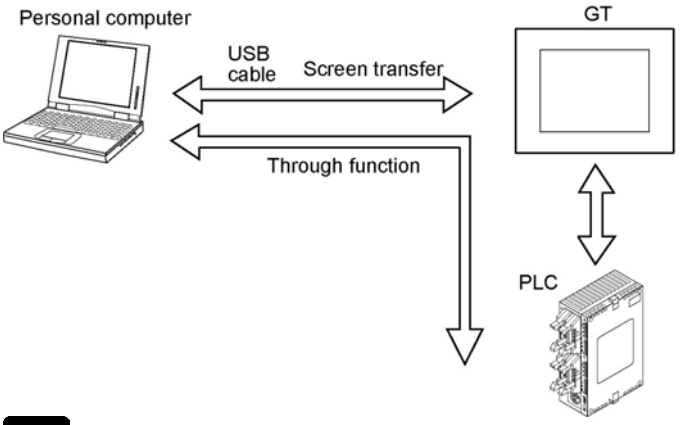
2.3.2 USB Port

USB connection

Communication with our software such as GTWIN becomes available by connecting to a PC with a USB cable.

Functions enabled by USB connection

- Through function using our PLCs
- Screen transfer (The communication in a speed approximately 3 times of the one with the Ethernet connection is possible.)



Note: If more than one programmable display unit or AE20 are connected to a PC using the USB port, the communication is not available.

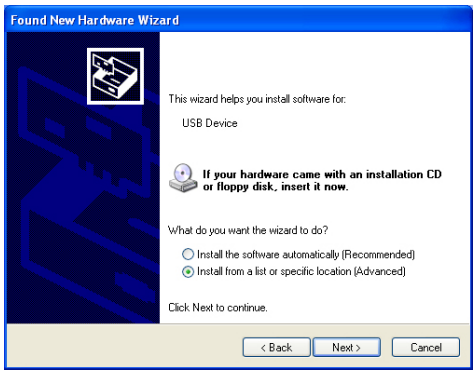
- Installation of the USB driver

The USB driver must be installed for connecting the USB.
Install it in the following procedure. (For both the CD and download version of the GTWIN, follow the procedure below.)

(1) Turn on the power supply of GT, and connect the GT and a PC with a USB cable.

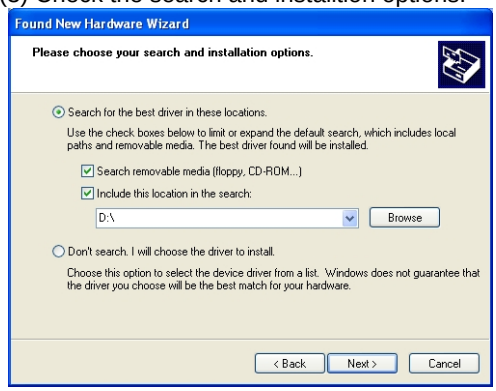
(2) After the connection, the PC automatically detects the USB driver. The “Found new hardware wizard” screen is dispalyed.

Select “No, not this time”, and click [Next].



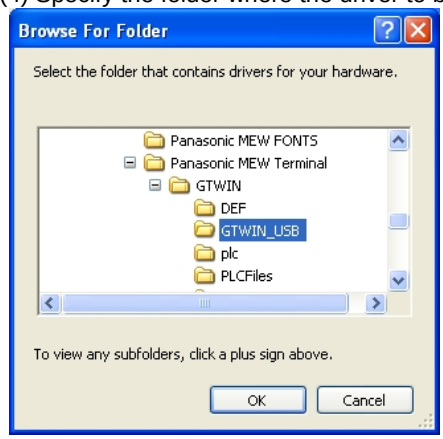
Select “Install from a list or specific location (Advanced)”, and click [Next].

(3) Check the search and installtion options.



Select “Don’t search. I will choose the driver to install.”, and click [Next].

(4) Specify the folder where the driver to be installed is saved.

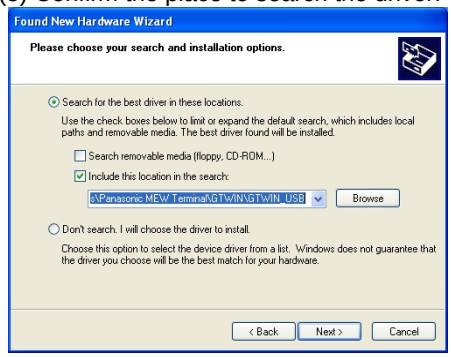


Specify the following folder, and click [OK].

Folder to be specified:
\Program Files\Panasonic-EW Terminal\GTWIN\GTWIN_USB

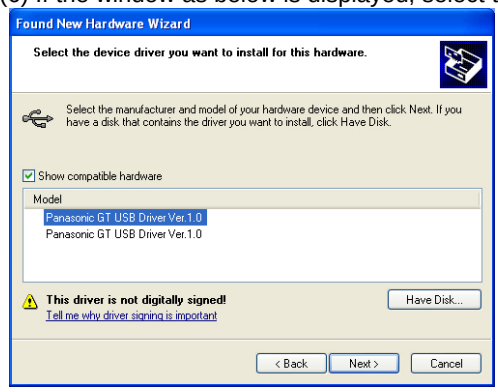
* If the driver is not in the above folder, specify the foler where the GTWIN has been installed.

(5) Confirm the place to search the driver.



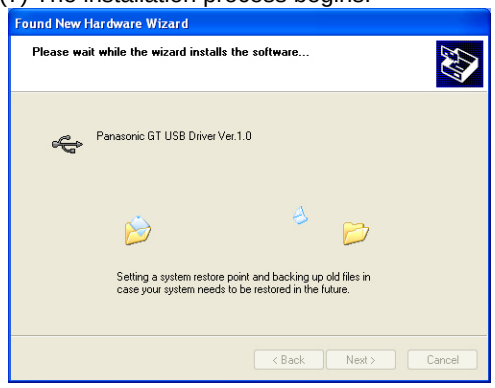
Confirm the sepcified folder, and click [Next].

(6) If the window as below is displayed, select the driver to be installed.



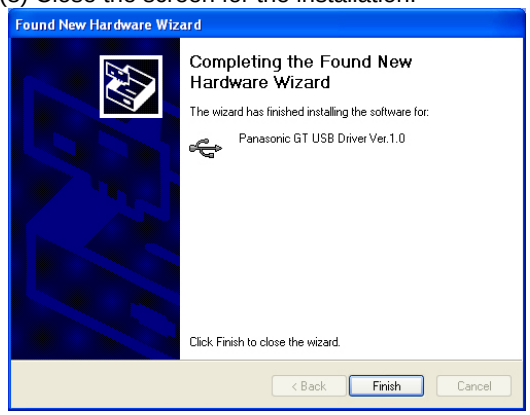
If the PC has more than one USB port and a USB driver has been already installed, the display shown in the left column is displayed. Select either driver, and click [Next].

(7) The installation process begins.



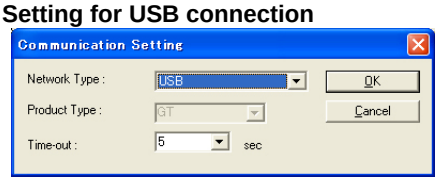
A message is displayed on the screen indicating that the installation is in progress, and the installtion of the USB driver begins.

(8) Close the screen for the installation.



A message is diplayed on the screen indicating that the installation completed. Click [Finish] to close the screen.

Setting for USB connection



This setting is necessary for transferring screens using GTWIN.
Select [GTWIN]→[File]→[Transfer]→[Condition]→[Network type], and change it to [USB].
Click [OK].

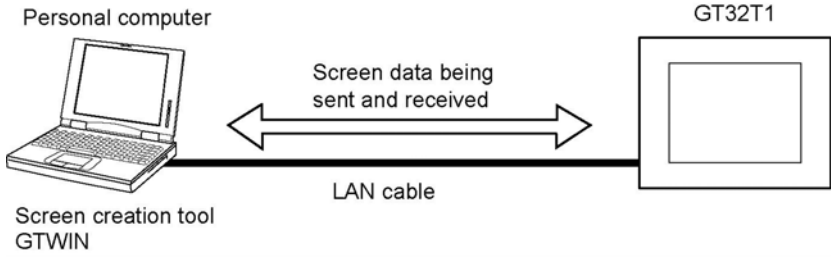
2.3.3 Ethernet Port

Ethernet connection

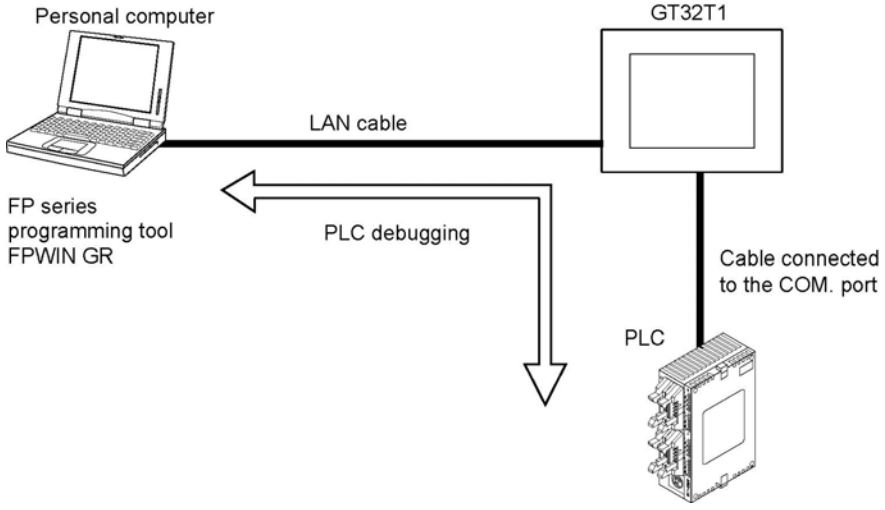
GT32T1 has a Ethernet port. Communication with our software such as GTWIN becomes available by connecting to a PC with a LAN cable.

Ethernet communication function

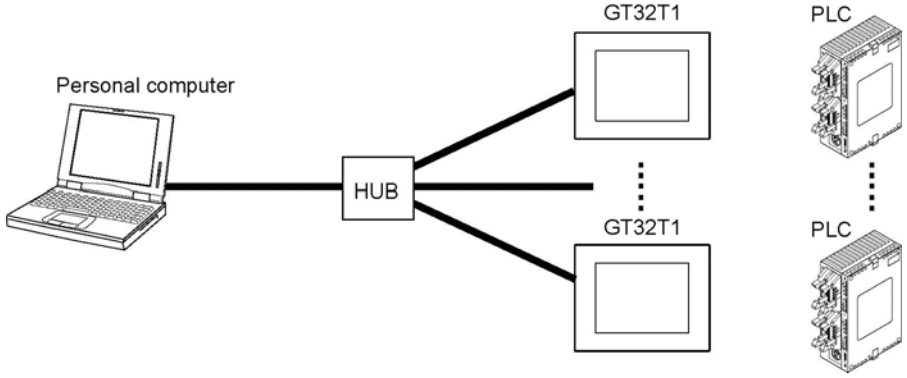
- Screen transfer (Baud rate: fixed at 115200 bps. It takes at least 3 times longer than the transfer using USB.)



- Through function using our PLCs



* Specifying the destinations to connect enables the communication with multiple units using a HUB.



Required items for connection

- **LAN cable**

  Either straight cable or crossing cable can be used.
(MDI/MDI-X Automatic crossover function)

 **Reference:** For the information on precautions when wiring Ethernet port,
<3.5 Precautions when Wiring Ethernet Port>

Settings for Ethernet connection

Follow the procedure below to communicate with the Ethernet connection.

1. Connect the GT to a PC with a Ethernet cable.
2. Specify the settings such as IP address for the GT.
3. Startup the GTWIN and specify the communication condition.

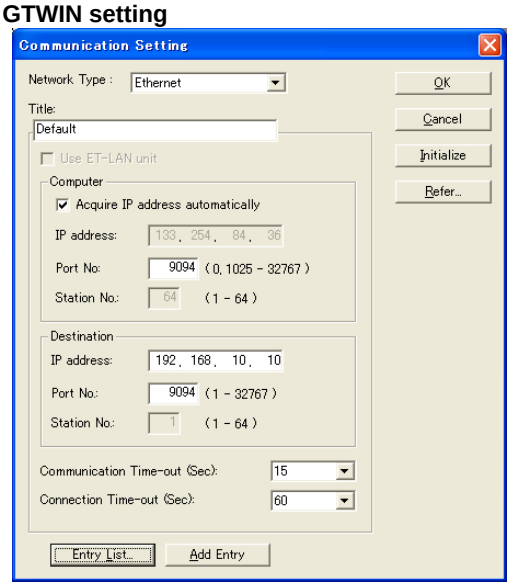
The factory settings are as follows.

IP Address	**192.168.1.5**
Subnetmask	**255.255.255.0**
Default Gateway	**192.168.1.**
Port No	**9094**

Note) Setting items such as IP address for the GT can be specified in the System Menu.

 **Reference:** <5.6.4 Setting Mode: “Communication Parameters” (COM port/Ether Port)>

GTWIN setting

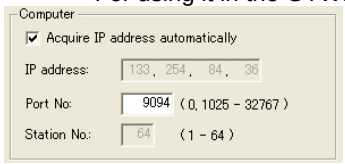


Network type: Ethernet
Title: Input an arbitrary title (Up to 38 one-byte characters)
Computer:
Check “Acquire IP address automatically”.
The default setting is to use the IP address currently being used in the computer.
Click [OK] to finish the setting.

Note) When sing multiple Ethernet cards, specify manually.

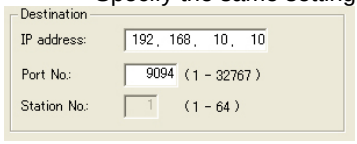
IP address: When it is not displayed, set the property of the TCP/IP in the items such as Network of the control panel. IP address can be input or changed.
Note) The setting procedure varies depending on the OS used. For the details, refer to the manual/help of the OS.

Port No.: Set to 0 or within the range of 1025 to 32767 in decimal.
For using it in the GTWIN, set it to 0.



- **Setting of destination (PLC side)**

IP address: Specify the IP address of the GT to be connected in decimal.
Port No.: Set it within the range of 1 to 32767 in decimal. (Default: 9094)
Specify the same setting as the one of GT.



- **Communication time out:** Set the time-out period after connection establishment for every communication within the range of 1 to 950 seconds. (Default: 15) (it is not linked to this setting until a connection is estalished)
- **Connection time out:** Set the time-out period until connection establishment within the range of 1 to 180 seconds. (Default: 60)

Setting with IP search tool (Config WD. exe)
The settings of the GT can be specified with the IP address search tool of Configurator WD (Ver.1.11 or later).
The IP search tool (Config WD. Exe) can be downloaded for free from our website
URL: http://panasonic-electric-works.net/ac (User registration is required.: Free of charge)

Chapter 3

Installation and Wiring

3.1 Installation

3.1.1 Installation Environment

When installing and using the GT series, always make sure the following conditions are observed.

Usage conditions

Operating environment (Use the unit within the range of the general specifications when installing)

- Ambient temperatures: 0 to +50 °C
  (It varies according to models when installing the unit in a horizontal orientation or using a C-NET adapter and FP programmer II.)
- Ambient humidity: 20 to 85% RH (at 25 °C, non-condensing)
- For use in pollution Degree 2 environment
- Do not use it in the following environments.
  - Direct sunlight, wind and rain. (This product is not designed for outdoor use.)
  - Sudden temperature changes causing condensation.
  - Inflammable or corrosive gas.
  - Excessive airborne dust, metal particles or saline matter.
  - Benzine, paint thinner, alcohol or other organic solvents or strong alkaline solutions such as ammonia or caustic soda.
  - Direct vibration, shock or places always exposed to drop of water.
    (This unit is warranted by IP65 (IP67 for GT12) for panel mounting, however, this applies to initial values.)
  - Influence from power transmission lines, high voltage equipment, power cables, power equipment, radio transmitters, or any other equipment that would generate high switching surges. (100 mm or more)

Static electricity

- Do not touch connector pins directly to prevent static electricity from causing damage.
- Always rid yourself of any static electricity before handling this product.
- If excessive estatic electricity is applied to the panel surface, the LCD display unit may be damaged.

Power supply

- Twist the wires of the power supply.
- The unit has sufficient noise immunity against the noise generated on the power line. However, it is recommended to take measures for reducing noise such as using an isolating transformer before supplying the power. And it is recommended to take measures such as installing a ferrite core.
- Allocate an independent wiring for each power supplying line, PLC etc and operating device.
- If using a power supply withoug a protective circuit, power should be supplied through a protective element such as fuse. Directly applying an abnormal voltage to the unit may cause the damage to the internal circuit.

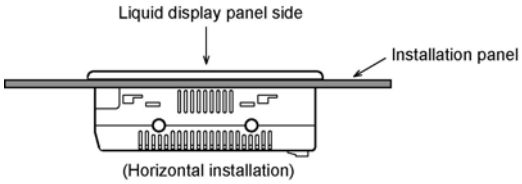
Touch-panel

- Always operate the touch switch with fingers. As the touch switch may be damaged due to the excessive load or shock (caused when being operated with any tools), the touch switch should be operated within the specified control force. Also, if the touch swich is pressed like kneading, the electrode may be worn out exceptionally, and cause the malfunction. Operate with a single touch of the switch.
- Do not drop or have a strong impact on the programmable display unit as glass is used for the LCD panel.
- The liquid in the LCD panel is a hazardous substance. If the LCD panel is broken, do not put the leaked crystalline liquid into your mouse. Should it get into your mouse, immediately gargle, and consult a doctor. If it adheres to your skin or clothes, wash it away with soap.
- There is a case that shadows appear in the place on the screen of the GT where no graphic or part is arranged. (The shadows appear as the extension of the characters, graphics or parts actually being displayed.) This is a phenomenon resulting from the basic characteristics of liquid crystal devices, and called cross talk.

3.1.2 Restriction According to Mounting Directions

If the unit is being installed in a horizontal orientation, or our Programmer II and C-NET adaptor are being connected to the TOOL port, note that the ambient usage temperature should be as below.

Model name	Condition	Ambient temperature
GT11	Vertically installed Programmger II C-NET adapter	0 to 45 °C
GT21	Horizontally installed Programmer II C-NET adapter	
GT30		0 to 40 °C
GT32	Horizontally installed	



Note) When installing the unit aslant, the restriction is the same as the one when installing horizontally.

3.1.3 Installation Space

Applicable panel thickness
A panel with a thickness of 1.0 to 5.0 mm should be used.

Clearance when the GT is installed
When installing the GT unit, if other parts are being installed to the panel or cables are being wired to it, we recommend providing a clearance around the GT unit. This prevents cables from being damaged, and facilitates the installation work. Also, make sure that the slits in the main unit are never obstructed.

Model name	Clearance	Clearance on the surface to connect the screen transfer cable	Clearance on the mounting surface when using a SD memory card
GT01	30 mm or more (50 mm or more recommended)	20 mm	-
GT11			
GT21			
GT30			
GT05		60 mm	40 mm or more
GT12			
GT32			

* It should be 40 mm or more when using a SD memory card.

3.1.4 UL/c-UL Qualification

Be aware of the following when applying for UL standard for the equipment that the GT has been built in.

- When the GT built in equipment, the GT should meet the standard as a part of the enclosure.
- As the rear of the GT is not qualified as an enclosure, provide a fire enclosure (metal barrier) that entirely covers the rear and lateral sides of the GT.

3.1.5 Mounting Screws

Secure the GT to a mounting plate using the fitting and screws provided with the unit.

Recommended screws

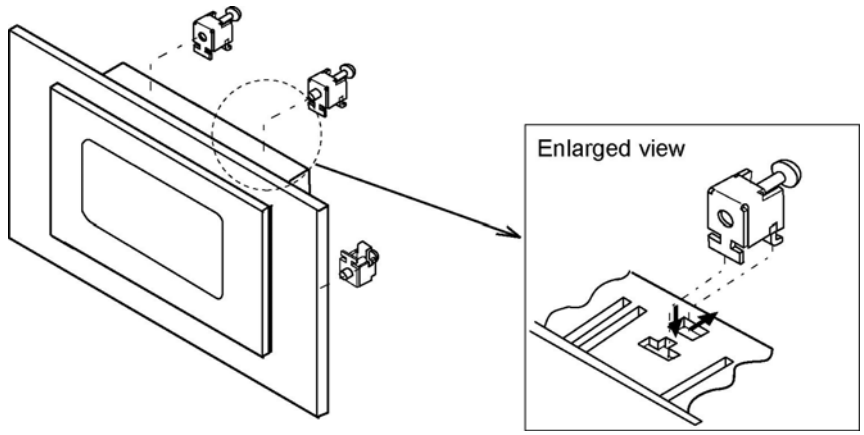
Recommended product	GT unit	Size	Others	Quantity
Mounting screw	GT01/GT11	M3 – 20	Material: SW pane-head (+) Galvanization, trivalent chromate	4 pcs/unit
	GT30	M3 – 25		
	GT05/GT21/GT32	M3 – 3.5		

The screw tightening torque should be 0.1 to 0.25 N· m, and tighten them uniformly.
Tightening the screws too hard can cause deformation of the panel, so that the touch switches will not function properly or water-proof property will be reduced.

3.1.6 GT01 and GT11 Installation Method

Secure the GT to the installation panel using the four fittings and four screws provided with the unit.

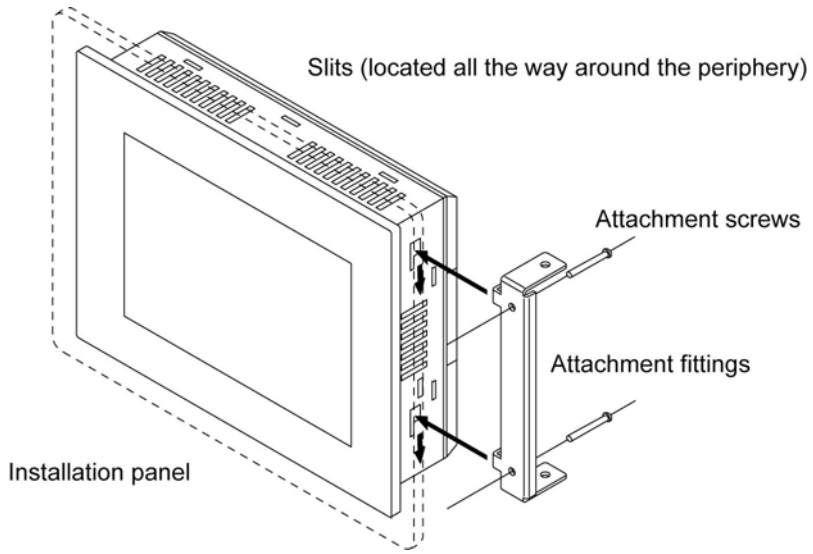
1. Place the GT in the installation panel.
2. Insert the fittings into the grooves provided in the GT, and tighten the screws to secure the GT to the installation panel.



3.1.7 GT21 Installation Method

Secure the GT21 to the installation panel using the two fittings and four screws provided with the unit.

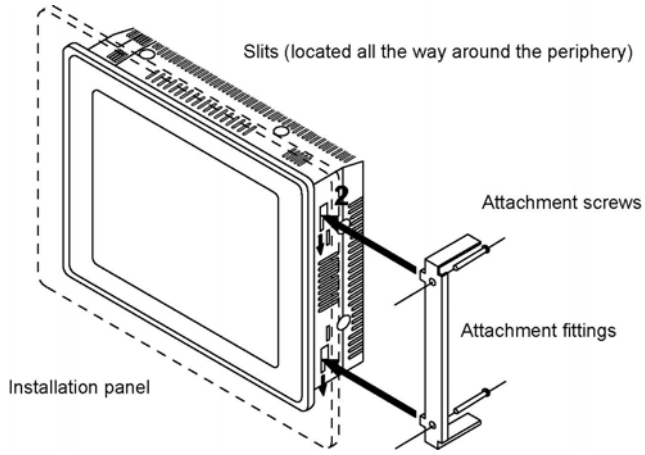
1. Place the GT21 main unit in the installation panel.
2. Insert the fittings into the grooves provided in the GT21 main unit, and tighten the screws to secure the GT21 main unit to the installation panel.



3.1.8 GT30 Installation Method

Secure the GT30 to the installation panel using the two fittings and four screws provided with the unit.

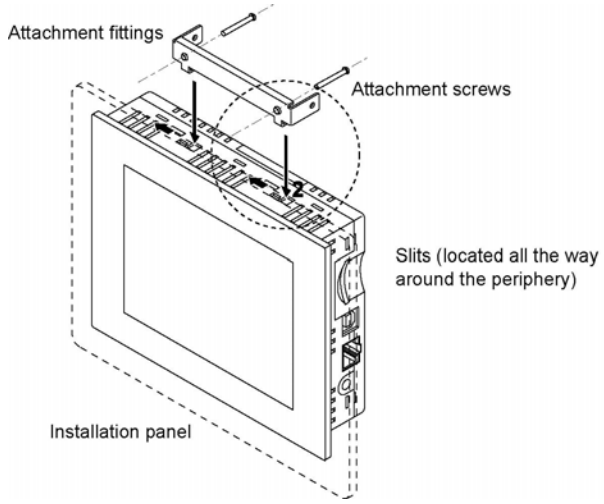
1. Place the GT30 main unit in the installation panel.
2. Insert the fittings into the grooves provided in the GT30 main unit, and tighten the screws to secure the GT30 main unit to the installation panel.



3.1.9 GT05/GT32 Installation Method

Secure the GT32 to the installation panel using the two fittings and four screws provided with the unit.

1. Place the GT main unit in the installation panel.
2. Insert the fittings into the grooves provided in the GT main unit, and tighten the screws to secure the GT main unit to the installation panel.

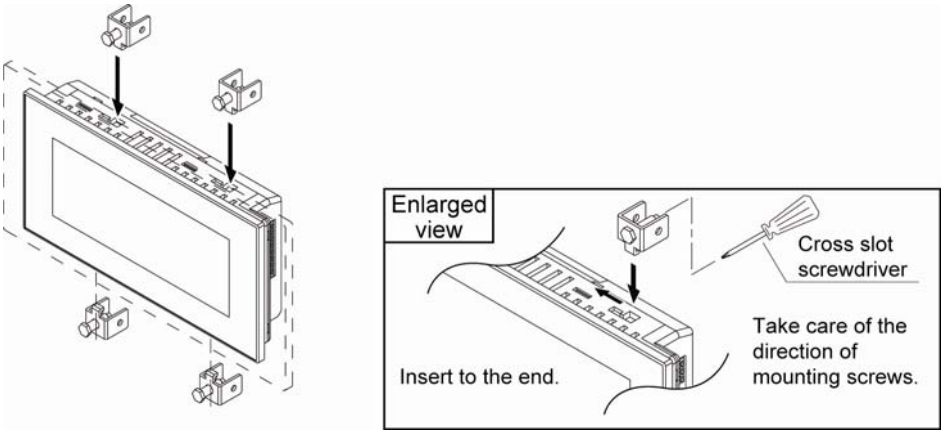


3.1.10 GT12 Installation Method

Secure the GT12 to the installation panel using the two fittings and four dedicated screws provided with the unit.

3. Place the GT main unit in the installation panel.

4. Insert the fittings into the grooves provided in the GT main unit, and tighten the screws to secure the GT main unit to the installation panel.



Note: - The cross slot screwdriver No. 1 must be used.
- Tightening torque: 0.2 to 0.3 N m
- Tightening the scews too hard can cause deformation of the front panel, so that the touch switches will not function properly.

GT12 dedicated screw

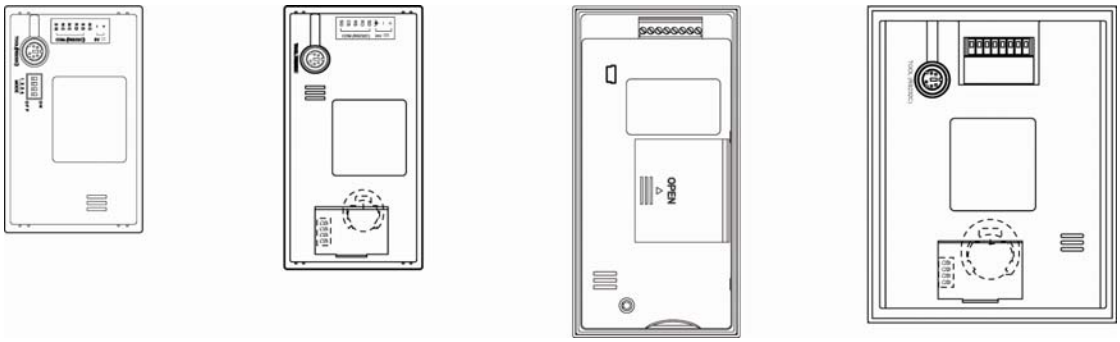
The GT12 dedicated screw is not sold on the open market.
Using screws other than the dedicated screw will cause failures such as decrease of water-proof property.

Name	Content	Model No.
Attachment fitting (with dedicated screws)	5 sets for GT12 4 pcs of attachment fittings and 4 pcs of dedicated screws/set	AIG12830

3.1.11 Installing in Vertical Orientation

Normally, the GT series is installed horizontally long, however, some models can be installed vertically long. At that time, the right side becomes the upper side.

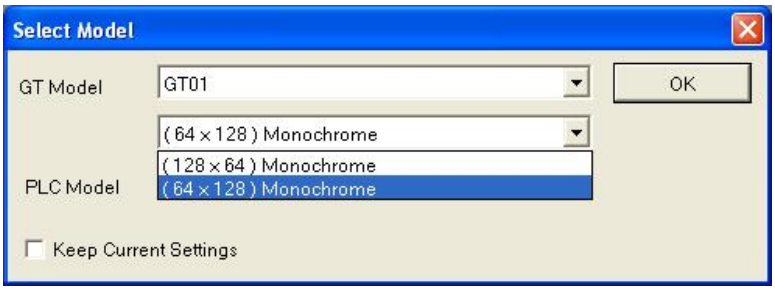
GT01 **GT11** **GT12** **GT21**



Note:

- The side that the COM port is situated becomes the upper side. If the GT is installed upside down, the screen will be upside down.
- The allowable ambient temperature for GT11 is different. (Ambient temperature: 0 to 45 °C)

Key Point: Select the vertical type when selecting a GT model in GTWIN.



3.1.12 Precaution When reinstalling GT

When the GT is reinstalled after being removed from the panel, the water-proof packing should be replaced.

Reference: <3.5 Water-proof Packing>

3.2 Wiring the Power Supply

3.2.1 Wiring the Power supply

The power supply should be wired by securely connecting the terminal on the rear of the main unit to the terminal.

Use twisted wiring for the power supply

In order to minimize influence from noise, the wiring for the power supply should be twisted.

Insulate the power supply inside a protective circuit

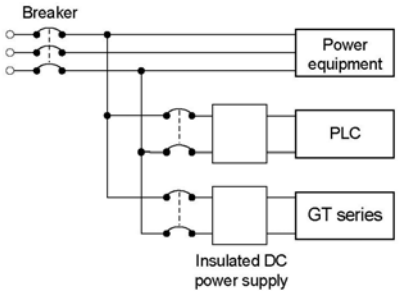
- In order to protect the unit against abnormal voltage from the power supply line, the power supply should be an insulated type, and should be enclosed within a protective circuit.
- A non-insulated requlator is used witht the GT series.
- If a power supply device without an internal protective circuit is being used, power should always be supplied to the GT series through a fuse or a similar protective device.

Keep the power supply voltage within the operating voltage range

Rated voltage	Operating voltage range
5 V DC	4.5 to 5.5 V DC
24 V DC	21.6 to 26.4 V DC

Keep the power supply wiring separate

- Wiring to the GT series, PLC, and other power equipment should have separate wiring systems.



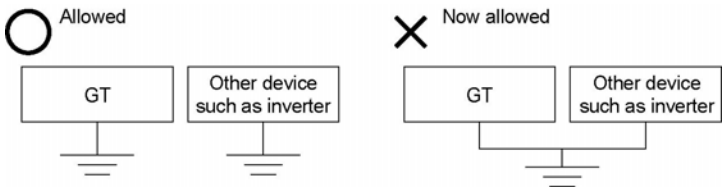
3.2.2 Grounding (24 V DC Type Only)

Be sure to ground when the influence of noise is great

The unit is tolerant against noise in normal environments, but if the environment is particularly susceptible to noise, please ground.

Use dedicated grounding

- For grounding purposes, use wires with a minimum of 2 mm^2. The grounding connection should have a resistance of less than 100 Ω.
- Make the grounding point as close as possible to the GT and keep the distance of the grounding wire short.
- Sharing the ground with another device may have an adverse effect. Therefore, be sure that grounding is dedicated.

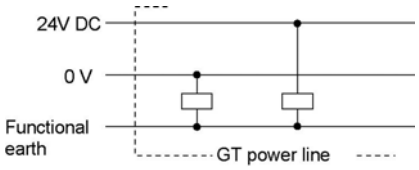


Note:

Conversely, depending on your environment, grounding may cause a problem.

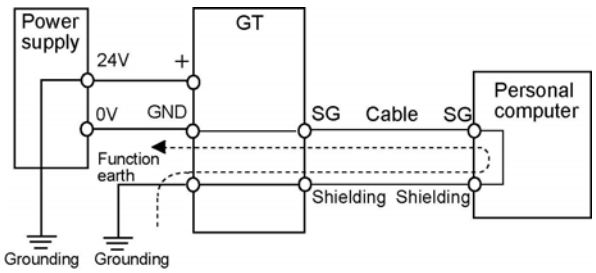
Example:

Since the power line of the GT unit is connected to a functional earth via electronic parts, the electronic parts may become damaged if there is an abnormal potential between the power line and the physical ground.



Do not ground the function earth when grounding a plus (+) terminal of the power. (exclusing GT32, GT12 and GT05)

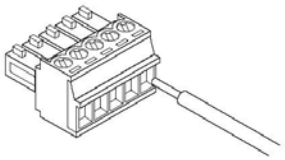
In some computers, the SG terminal of RS232C port and connector shielding are connected. Also the tool port shielding is connected with the function earth terminal. Therefore, the GND terminal and the function earth terminal are connected if the computer is connected. Especially when the GT is connected to a computer with a plus (+) terminal grounded, therefore, an GT's minus (-) terminal is connected with the function earth terminal. As a result, short circuit occurs which may lead to the breakage of GT and its neighboring parts.



3.3 Wiring the COM Port

Accessory communication connector/applicable wiring

The communication connector used for the COM port (provided as an accessory with the main unit) has a screw-tightening type of terminal block. The wiring shown below should be used.



Applicable wiring (twisted wiring)

Size	Conductor cross-section surface area
AWG #28 to 16	0.08 to 1.25 mm^2

Use a special tool to tighten the terminal block of the communication connector.

Using a screwdriver made by Panasonic Electric Works Co., Ltd. (Product number: AFP0806). The tightening torque should be 0.22 to 0.3 N· m or less.

When doing RS485 communication using RS422 type

Please use the following cables or equivalent.

Appropriate electrical cables (twisted cables)

Type	Cross-sectional view	Conductor		Insulator		Cable diam.	Sample appropriate cable
		Size	Resistance (at 20°C)	Material	Thickness		
Shielded twisted pair		1.25 mm^2 (AWG16) or greater	Max. 16.8 Ω/km	Polyethylene	Max. 0.5 mm	Approx. 8.5 mm	Belden 9860 Hitachi Cable, Ltd. KPEV-S1.25 mm^2 x 1P
		0.5 mm^2 (AWG20) or greater	Max. 33.4 Ω/km	Polyethylene	Max. 0.5 mm	Approx. 7.8 mm	Belden 9207 Hitachi Cable, Ltd. KPEV-S0.5 mm^2 x 1P

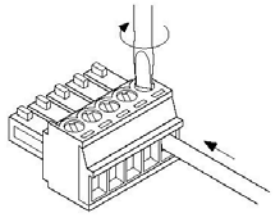
Note:

- Use shielded twisted pair cables.
- Use only one type of transmission cable. Do not mix more than 1 type.
- When using shielded cable with crossover wiring for the RS485 transmission line, grounded one end.

Wiring method

(1) Remove the sheath from the wire.

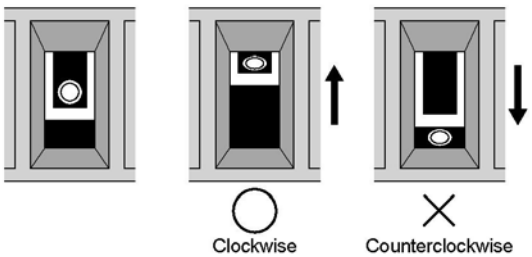
(2) Insert the wire all the way into the terminal block, and tighten the screw in the clockwise direction to secure it.



Precautions concerning wiring

The following precautions should be observed, to avoid broken or disconnected wires.

- When removing the sheath, be careful not to scratch the core wire.
- Wire the terminal without twisting the core wire.
- The core wire should be connected without soldering it. Vibration can sometimes cause soldered connections to break loose.
- After connecting the wiring, avoid subjecting the cable to stress.
- Because of the construction of the terminal, tightening the wire in the counterclockwise direction will cause a faulty connection. If this happens, disconnect the wire, check the terminal hole, and connect the wire again.



Reference:

For information on connecting the COM port of the GT series with various PLC units, refer to <Chapter 4 Connecting with the PLC>.

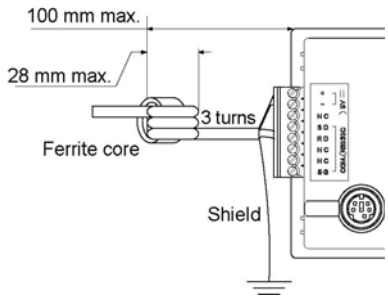
3.4 Precautions when Wiring COM Port

Precautions are different depending on communication conditions. Arrange wirings according to the following instructions.

3.4.1 GT01 (5 V DC)

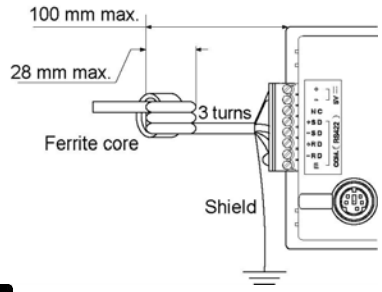
RS232C type

- Perform wiring and placement of the cable so that there is no impression of external noise on the cable and no induction.
- Use shielded wires for distribution cables.
  (Recommended cable: AIGT8142 with one ferrite core)
- It conforms to CE marking. As conditions, the following wiring is required.
  1. Make the cable do three turns around a ferrite core.
     (Recommended ferrite core: Seiwa Electric's E04RA190120080 or equivalent)
  2. Perform grounding of the cable shield.
     * Packaged with AIGT8142.



RS422 (RS485) type

- There is no RS and CS (control lines).
- Perform wiring and placement of the cable so that there is no impression of external noise on the cable and no induction.
- Use shielded wires for distribution cables.
  (Recommended cable: AIGT8152 with one ferrite core(Seiwa Electric's E04RA190120080))
- "E" is used to set the terminating station.
- It does not conform to European EMC directive.



Reference: <3.2.2 Grounding>

Key Point:

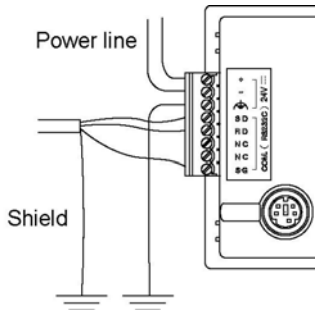
The CE marking standards that the GT01 conforms to (excluding the RS422 (RS485) type)
European EMC directive 89/336/EEC
European EMC standards (EN61000-6-4 and EN61000-6-2)

3.4.2 24 V DC

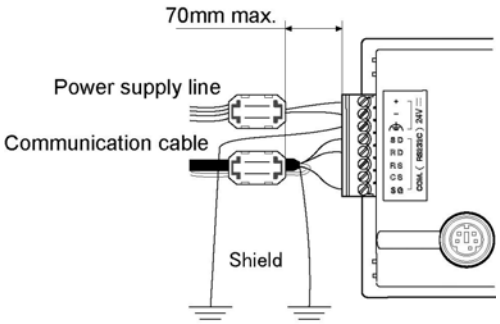
RS232C type

- There is no CS (control lines) for GT01.
- Perform wiring and placement of the cable so that there is no impression of external noise on the cable and no induction.
- Use shielded wires for distribution cables. (Recommended cable: AIGT8162)
- It conforms to CE marking. As conditions, the following wiring is required.
  1. Install a ferrite core to the cable. (For GT11 only)
     (Recommended ferrite core: Seiwa Electric's E04SR170730A or equivalent)
  2. Perform grounding of the cable shield.
  3. Perform grounding of the GT.

GT01/GT12

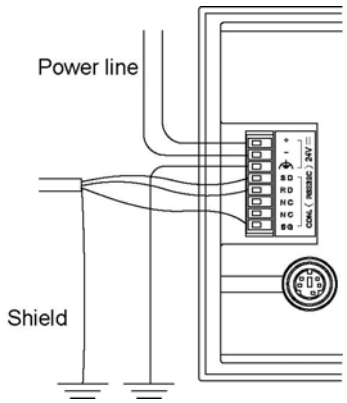


GT11

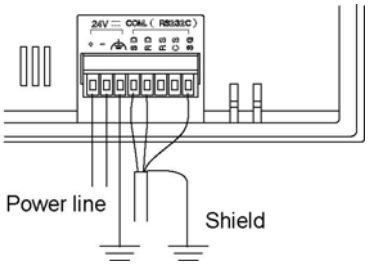


Installing Ferrite core

GT21



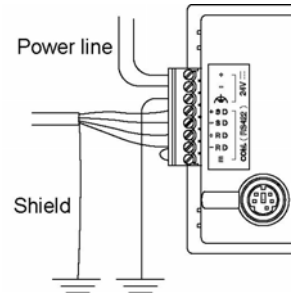
GT05/GT32



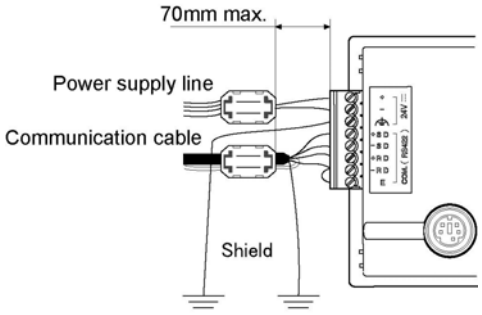
RS422 (RS485) type

- There is no RS and CS (control lines).
- Perform wiring and placement of the cable so that there is no impression of external noise on the cable and no induction.
- Use shielded wires for distribution cables. (Recommended cable: AIGT8175)
- "E" is used to set the terminal unit.
- It conforms to CE marking. As conditions, the following wiring is required.
  1. Fit a ferrite core to the cable. (For GT11 only)
     (Recommended ferrite core: Seiwa Electric's E04SR170730A or equivalent)
  2. Perform grounding of the cable shield.
- 3. Perform grounding of the GT.

GT01/GT12

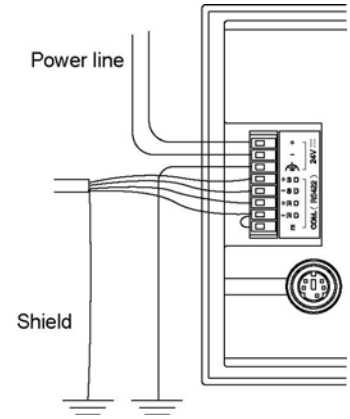


GT11

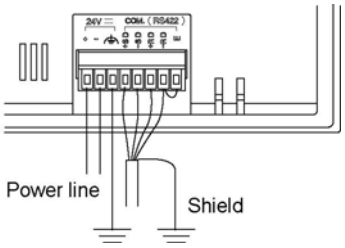


Installing Ferrite core

GT21



GT05/GT32



Reference: <3.2.2 Grounding>

Key Point:

The CE marking standards that the GT series conforms to

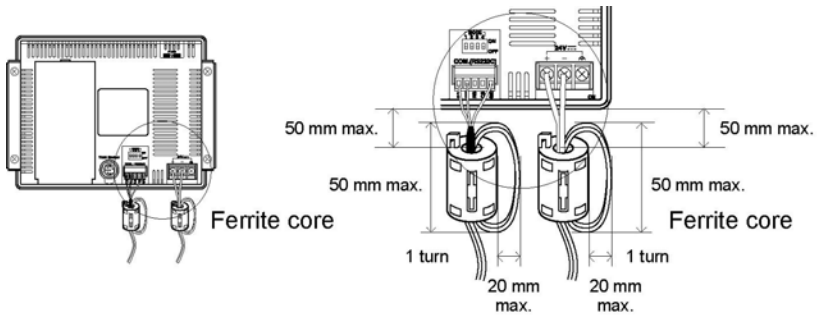
European EMC directive 89/336/EEC

European EMC standards For GT01, GT12, GT11, GT21 (EN61000-6-4 and EN61000-6-2)
For GT05, GT32 (EN61131-2)

3.4.3 GT30 (24 V DC)

- When connecting the unit to the FP series, there is no need to wire both the RS and CS.
- Perform wiring and placement of the cable so that there is no impression of external noise on the cable and no induction.
- Use shielded wires for distribution cables. (Recommended cable: AIGT8192)
- It conforms to CE marking. As conditions, the following wiring is required.

3. A ferrite core should be installed when wiring to the COM port and power supply terminal.
   When installing make sure that the connection and power cables are not stressed (This could result in broken connections.
   (Recommended ferrite core: Seiwa Electric's E04RS211132 or equivalent)



Reference: <3.2.2 Grounding>

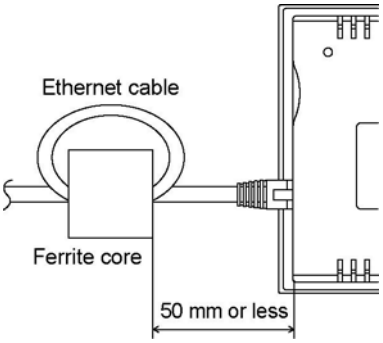
Key Point:

The CE marking standards that the GT30 conforms to
European EMC directive 89/336/EEC
European EMC standards (EN61000-6-4 and EN61000-6-2)

3.5 Precautions when Wiring Ethernet Port (GT32T1)

- Although more than one GT32T1 can be connected using a hub, communication is performed with one unit each. Specify each destination to communicate.
- Use a UTP cable (unshielded cable) for the Ethernet cable, and take measures for noises such as installing a ferrite core if necessary.
- It conforms to CE marking. As conditions, the following wiring is required.
    1. Do not use a shield wire for the Ethernet cable.
    2. Install a ferrite core to the Ethernet cable and make one turn.
       (Recommended ferrite core: Kitagawa Industries SFC-10 or equivalent)

GT32T1



Key Point:
The CE marking standards that the GT32 conforms to
European EMC directive 89/336/EEC
European EMC standards (EN61131-2)

3.6 Options

3.6.1 Backup Battery

Backup battery

The internal data in the GT can be backed up using the backup battery.
Use the following backup batteries.

GT model	Battery type	Product No.
GT11	Button type lithium battery	CR2032 (commercial item)
GT21		
GT30		
GT32	Backup battery	AFPX-BATT (The backup battery for the FP-X is used.)
GT12		
GT05		

Battery life

Battery life, when operating at a normal temperature (25°C), a normal humidity (65% RH), and a voltage of 24 V DC, is as follows.

GT model	life
GT11	Approx. 2 years
GT21	
GT30	
GT32M	Approx. 5 years
GT32T *	Approx. 3 years
GT05S	Approx. 3 years
GT05M	Approx. 5 years
GT05G	
GT12	

Backup

The internal data of the GT is backed up in the following ways.

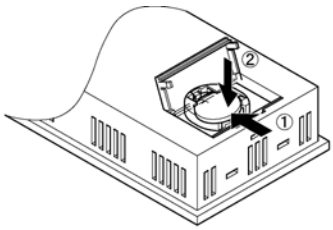
Internal data to be backed up	Stored in	Backup battery
Hold PLC Device data Clock data GT internal device hold data Alarm history data	Stored in the SRAM.	Required
Screen data GT configuration data	Stored in the F-ROM.	Not requred

Note:

When using a backup battery, attach the battery before the power supply is turned on.

3.6.2 How to Install the Battery (Lithium Button Battery)

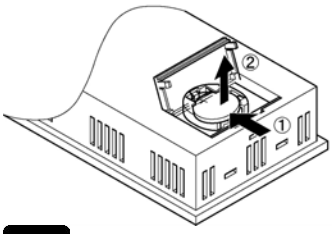
(The figures below is explained using the GT11.



When installing the battery

①Insert the head of the battery in the battery holder, and push it into the back.

②Press the battery down pushing it into the back of the battery holder.



When removing the battery

①Push the battery into the back of the holder.

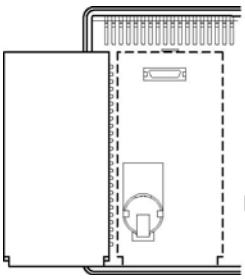
②Pull up the battery pushing it into the back of the battery holder.

Note: Do not touch the electronic parts when removing and installing the battery.

3.6.3 How to Install the Battery (GT30)

A battery is installed in the GT30.

In order to prevent the battery from discharging, an insulation sheet is inserted.
Before turning on the power, always remove the insulating sheet.



Remove insulation sheet.

When removing the battery

(1) Push up the battery using an insulated slotted screwdriver.
(2) Push out the battery having the right and left metal parts of the battery holder in your hand, and remove it.

When installing the battery

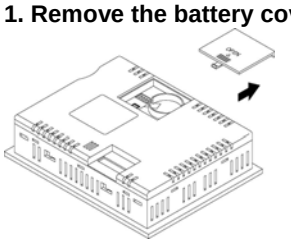
(1) Insert the head of the battery in the battery holder with the positive pole side up, and push it into the back.
(2) Push it into the back until it is settled in the battery holder horizontally.

Note: Do not touch the electronic parts when removing and installing the battery.

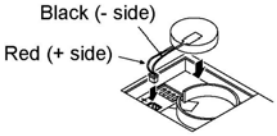
3.6.4 How to Install the Battery (Backup Battery)

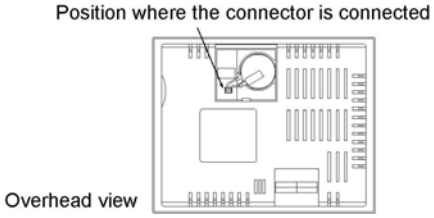
The figures below is explained using the GT32.

1. Remove the battery cover.

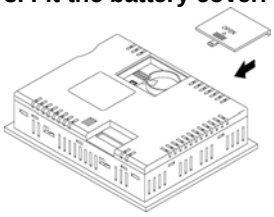


2. Connect the connector to make the red line be the (+) side, and place a battery in the circular frame.





3. Fit the battery cover.



3.6.5 Dead Battery Mark

If the battery voltage drops too low, the battery mark is displayed at the bottom right of the GT screen.

When the battery voltage drops

 (For GT30)

It can be specified in the GTWIN configuration settings, whether or not the dead battery mark is displayed .

Reference: <5.2.6 Setup>

Note:

If the battery voltage drops too low, the BAT LOW flag of the basic communication area map goes on. If the battery has run down completely, the BAT flag of the basic communication area map goes on. Please be aware that the BAT flag goes on the first time that the power supply is turned on after the unit is purchased.

* The BAT and BAT LOW flags in the basic communication area map activate in the both cases that the battery error display is set to “On” and “Off”.

Reference: <5.5 Setting the Basic Communication Area Between the GT and PLC**>**

3.6.6 Time for Replacement of Battery

When replacing the backup battery, turn on electricity for the time for energization, and replace the battery with a new one within one minute after turning off the power supply.
If the battery is not replced within the time for replacement, the saved data will be lost.

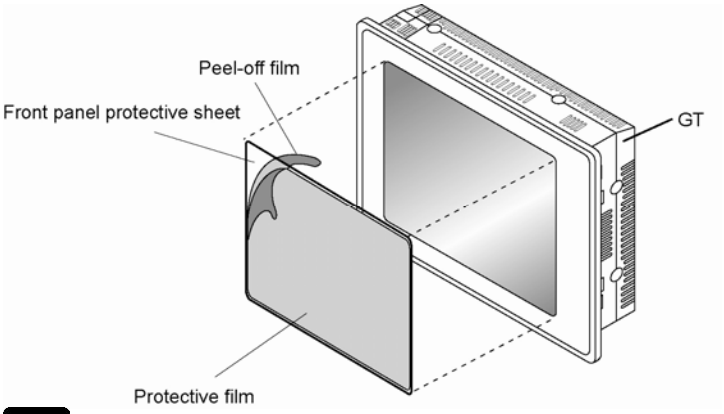
Time for energization	Time for replacement
1 min. or more (10 min. or more for GT32)	Within 1 min.

3.6.7 Replacement of Front Panel Protective Sheet

About the front panel protective sheet
Use the separately-sold protective sheets to protect the touch panel surface and to keep it clean.

Replacing the front panel protective sheet (For the type with protective film)
Follow the steps below to replace the sheet:

1. Peel off the seal from the provided protector sheet and attach it to the unit.
Take out one of the replacement front panel protective sheets and peel off the seal with the shiny side. When attaching the sheet, align the adhesive edges with the front of the GT. Finish by peeling off the thin film attached to the top of the front panel protective sheet.

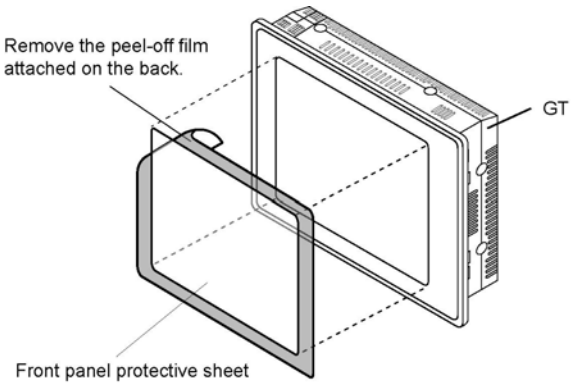


Note:
For GT30
The front panel protective sheet is attached on the GT30 before shipment.
Remove the sheet before replacing it.

Replacing the front panel protective sheet (For the type without protective film)

1. Remove the peel-off film attached to the front panel protective sheet.

2. Attach the front panel protective sheet.
Attach the front sheet to fit the liquid crystal part of GT. At this time, try not to allow the air to get in the attached face. If the air was in, remove the air to be out with fingers. Do not press the front panel hard as it may cause the damage to the touch switch.



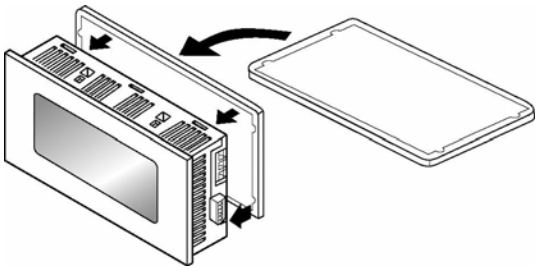
3.6.8 About the Waterproof Packing

If the panel is being detached from the GT and then reattached, the waterproof packing should be replaced, in order to assure that the panel remains waterproof (IP65. IP67 for GT12).

Replacing the waterproof packing

1. Remove the currently attached waterproof packing.
Remove the attached waterproof packing from the GT.

2. Attach the provided waterproof packing.
Take out one of the replacement waterproof packing pieces and attach the outer edge as shown in the illustration (do not use the inner edge).
When doing this, fasten it to the front frame, being sure not to twist the waterproof packing.
As for the model with a grooved front frame, surely fit the waterproof packing in the groove.



3.6.9 Replacing the Backlight (Sold Separately) (Applies Only to GT30)

About the backlight

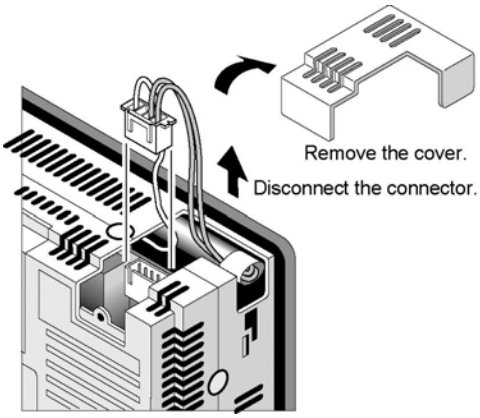
The average service life of the GT30 backlight is 50,000 hours (at room temperature, normal humidity, and 24 V DC). (“Service life” refers to the period over which the brightness diminishes by half, and does not mean that the backlight no longer lights at all.) If the backlight has become dim, it should be replaced with a replacement backlight (sold separately).

Product name	Contents	Product number
Replacement backlight	For color and monochrome LCD types	AIGT382

Replacing the backlight

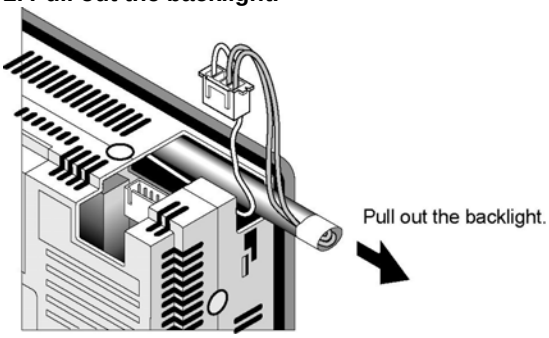
When replacing the backlight, always turn off the power supply to the GT30, and then refer to the procedure outlined below.

1. Take off the cover and disconnect the connector.



Remove the cover, and pull out the connector in the upward direction, as shown in the illustration.

2. Pull out the backlight.



Gently pull out the backlight.
To install the new backlight, reverse the procedure.
*After replacing the backlight, be careful that the backlight cable is not pinched by the case, cutting through it.

Note:

When replacing the backlight, always turn off the power supply to the main unit. Also, we recommend wearing gloves when doing this, to prevent injuries.

Chapter 4

Connecting with PLC

4.1 Connection with PLC

How to connect with PLC

- **Connecting between one GT and one PLC via 1:1 communication**
- **Connecting between one GT and multiple PLCs via 1:N communication (PLC multiple connection)**
- **Connecting between one PLC and multiple GTs via 1:N communication (GT link)**
- **Connecting using the general-purpose serial communication mode**
- **As for the 5 V DC-type GT01, power can be supplied with a communication cable only.**

4.1.1 PLC Multiple Connection

A maximum of 31 Panasonic PLC units can be connected via RS485 communication.

Usable GT

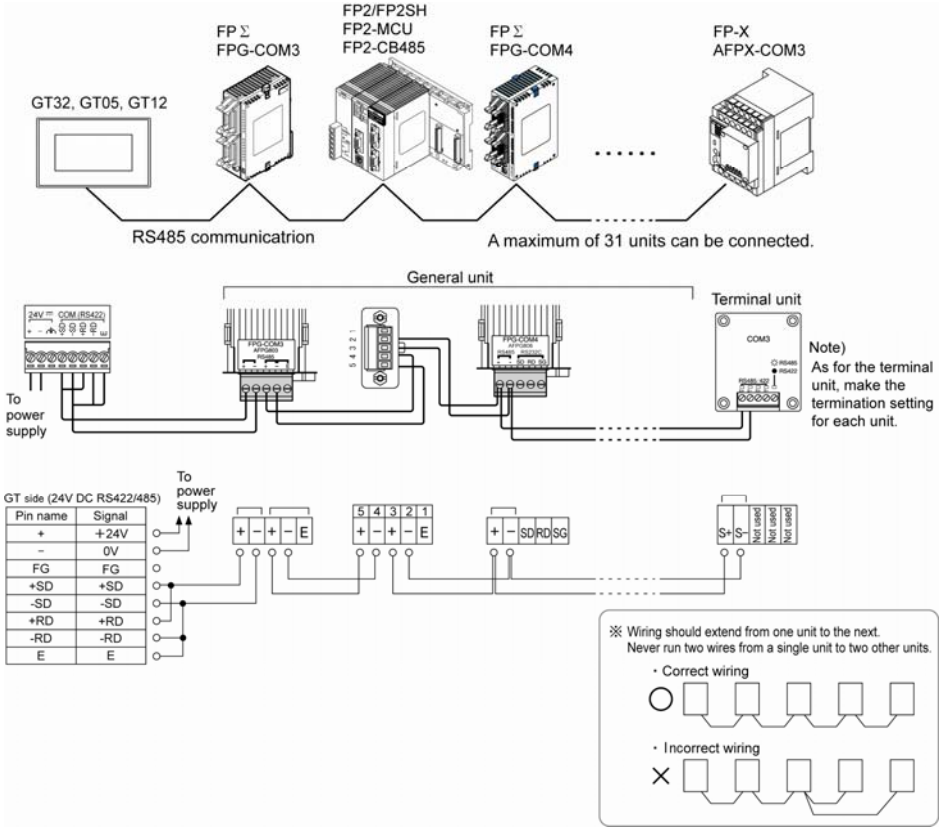
- GT05 Ver.1.3 or later
- GT12 Ver.1.0 or later
- GT32 Ver.1.4 or later

Usable PLC

- FP-X, FP-X Communication cassette, AFPX-COM3, AFPX-COM4, AFPX-COM6
- FPΣ, FPΣ Communication cassette, AFPG803, AFPG806
- FP2/FP2SH, FP2-MCU, FP2 Communication block AFP2805

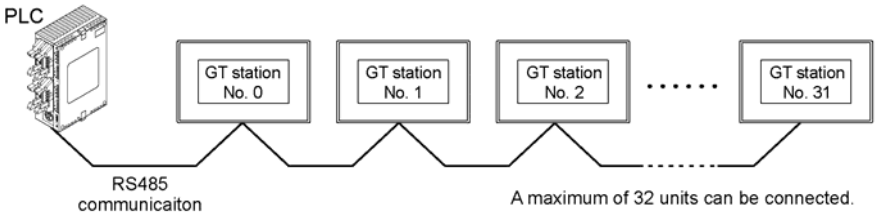
Features

- More than one PLC can be controlled with one GT via RS485 communication (computer link).
- Only Panasonic PLCs can be connected. However, even if the models vary, they can be connected to one GT.
- PLCs can be named arbitrarily when setting unit numbers. It makes it easier to distinguish for which PLC each part is set. (Up to 64 characters)



4.1.2 GT Link Connection

GT link function is a function that enables more than one GT to connect with one PLC.



Reference: <Chapter 6 GT Link>

4.1.3 Connecting to the PLCs made by Other Companies

For information on the connection with PLCs manufactured by other companies, see the latest GTWIN HELP or our website (http://www.panasonic-electric-works.net/ac) where you can get the manual.

Reference: < Connection with Other Companies' PLCs Manual ARCT1F449E>

4.1.4 Connecting to a Serial Device

Devices other than PLCs can be connected by using the general-purpose serial communication mode of the GT. Also, PLCs made by other companies which are not put on our website can be used. See our website or the GT series General-purpose serial communication manual.

Reference: <GT Series General-purpose Serial Communication Manual ARCT1F356E>

4.1.5 Electric Supply from PLC (5 V DC-type GT01)

The power can be supplied to the 5V DC-type GT01 with the communication cable only. The power supply is not required separately. However, it is available only when it is connected with the TOOL port.

Restriction on the capacity of the power supply depending on the PLC model to be used
The number of PLC units that can be expanded is limited.

PLC model	Restrictions when connecting a 5 V DC-type GT01
FP-X	The number of units which can be expanded depends on the unit type.
FP0	Maximum of two expansion units *
FPΣ	Maximum of six expansion units *
FP2	The method for calculating the number of units that can be expanded is provided in the manual. Follow that formula and keep the GT01's power consumption not higher than 200 mA when calculating.
FP2SH	
FP-e/FP0R	There are no particular restrictions.
FX series made by Mitsubishi Electric Co.	The restrictions are equivalent to the restrictions on the programmable display F920 (5 V power supply type) made by Mitsubishi. Use the FX series according to the use conditions for the F920 (5 V power supply type).

* Expansion is possible with the number of units given above, regardless of the type of unit.

Reference: <FP-X User's Manual ARCT1F409E>
<FP2/FP2SH User's Manual ARCT1F302E>

4.2 RS232C Connection

4.2.1 Difference of Terminal blocks Between GT Models

Although the terminal blocks vary according to the GT models, the connection method is the same.
The connection diagram for 24 V DC is described with the terminal blocks other than the one for GT01.

24 V DC type other than GT01

GT side (24V DC RS232C)

Pin name	Signal
+	+24V
-	0V
FG	FG
SD	SD
RD	RD
RS	NC
CS	NC
SG	SG

5 V DC-type GT01

GT side (5V DC RS232C)

Pin name	Signal
+	+5V
–	0V
NC	NC
SD	SD
RD	RD
NC	NC
NC	NC
SG	SG

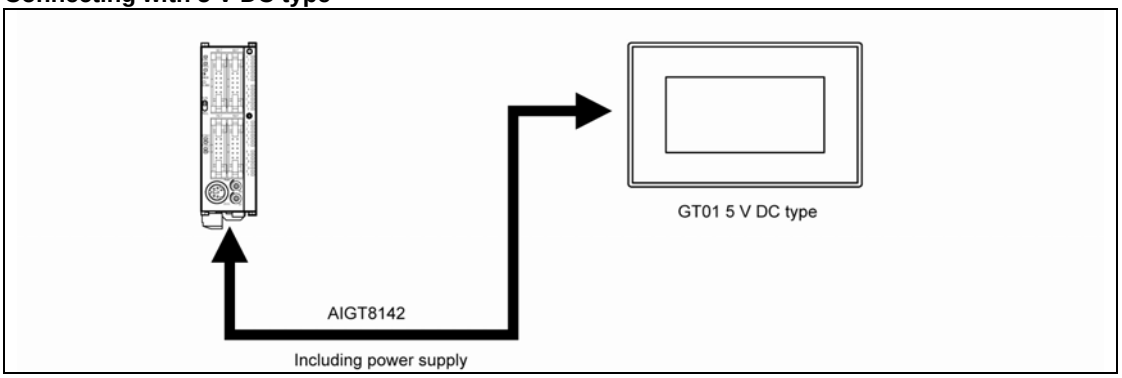
24 V DC-type GT01

GT side (GT01, 24V DC RS232C)

Pin name	Signal
+	+24V
–	0V
NC	NC
SD	SD
RD	RD
NC	NC
NC	NC
SG	SG

4.2.2 RS232C Connection with PLC Tool Port

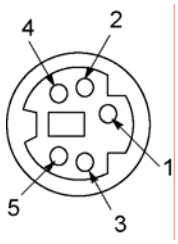
Connecting with 5 V DC type



Usable models

PLC	PLC communication cable		Programmable display		
FP-X FPΣ FP0/FP0R FP-e FP2/FP2SH	Mini-DIN 5-pin loose-wire cable	AIGT8142	GT01	5 V DC type	RS232C type

Connecting to the TOOL port



PLC side

Pin No.	Signal	Cable color
1	SG	Brown
2	SD	Red
3	RD	Orange
4	-	-
5	+5V	White
-	SHELL	Black

GT side (5V DC RS232C)

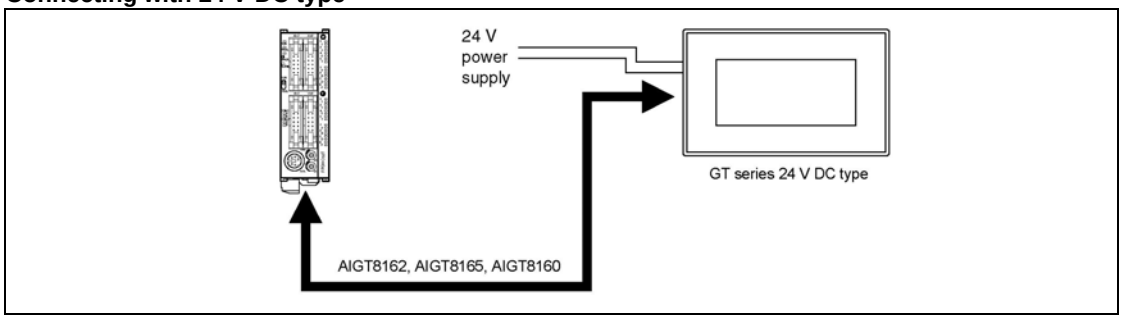
Pin name	Signal name
+	+5V
–	0V
NC	NC
SD	SD
RD	RD
NC	NC
NC	NC
SG	SG

Reference: <4.5.3 How to Make Communication Settings Using the FPWIN GR>

Note: Connecting to the COM port is not available.

- Keep the cable no longer than 3 m.
- In case of connecting to PLC with all expansion slots used, prepare an external 5 V DC power supply for the GT01 due to current consumption limits.
- When using the FP2/FP2SH, check whehter or not the power can be supplied from the TOOL port according to the calculation method of the number of expansion units described in the hardware manual.

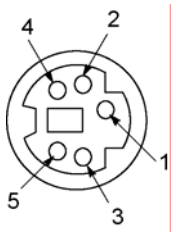
Connecting with 24 V DC type

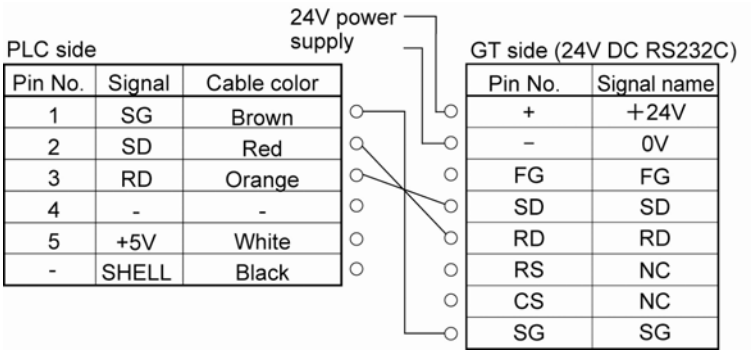


Usable models

PLC	PLC communication cable		Programmable display (Excluding GT30)	
FP-X FPΣ FP0/FP0R FP-e FP2/FP2SH	Mini-DIN 5-pin loose-wire cable	AIGT8162 AIGT8165 AIGT8160	24 V DC	RS232C type

Connecting to the TOOL port





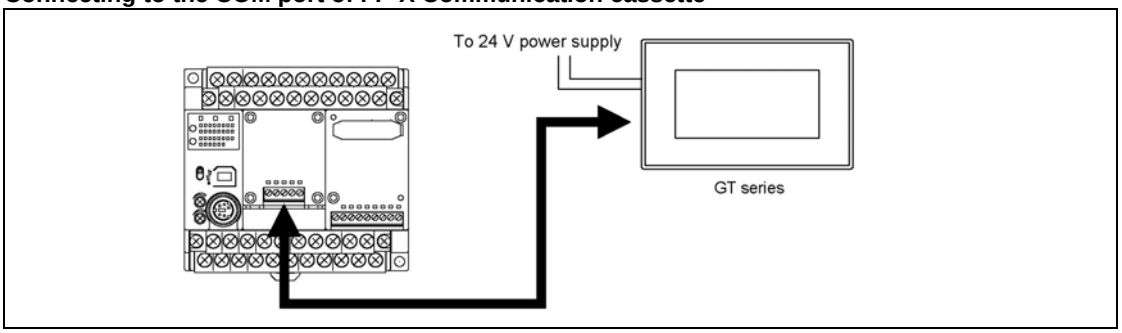
Pin No.	Signal	Cable color
1	SG	Brown
2	SD	Red
3	RD	Orange
4	-	-
5	+5V	White
-	SHELL	Black

Pin No.	Signal name
+	+24V
–	0V
FG	FG
SD	SD
RD	RD
RS	NC
CS	NC
SG	SG

Reference: <4.5.3 How to Make Communication Settings Using the FPWIN GR>

4.2.3 RS232C Connection with FP-X COM Port

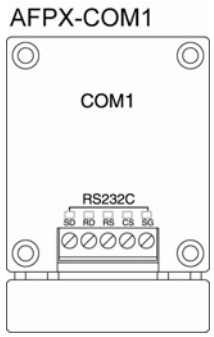
Connecting to the COM port of FP-X Communication cassette



Usable models

PLC		PLC communication cable	Programmable display (Excluding GT30)	
FP-X	AFPX-COM1	Loose-wire cable	5 V DC 24 V DC	RS232C type
	AFPX-COM2			
	AFPX-COM3			
	AFPX-COM4			
	AFPX-COM5			

Connecting to the 1- channel type RS232C



To power supply

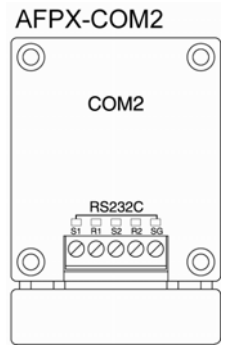
PLC side

Pin name	Signal
SD	SD
RD	RD
RS	RS
CS	CS
SG	SG

GT side (24V DC RS232C)

Pin name	Signal
+	+24V
-	0V
FG	FG
SD	SD
RD	RD
RS	NC
CS	NC
SG	SG

Connecting to the 2-channel type RS232C



To power supply

PLC side

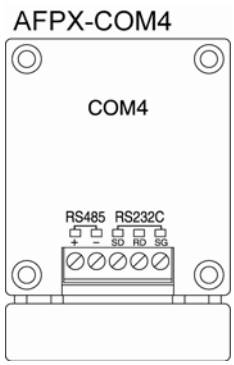
Pin name	Signal name
S1	SD
R1	RD
S2	SD
R2	RD
SG	SG

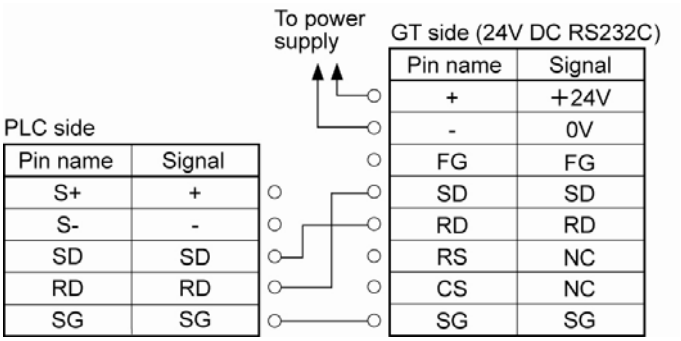
GT side (24V DC RS232C)

Pin name	Signal
+	+24V
-	0V
FG	FG
SD	SD
RD	RD
RS	NC
CS	NC
SG	SG

As for the connection to S2 and R2 for COM2, make the same connection as S1 and S2.

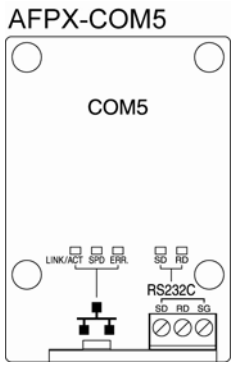
Connecting to the 1-channel type RS485 and 1-channel type RS232C

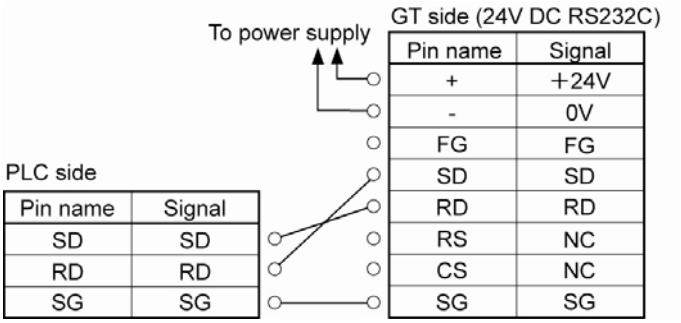




Connecting to the 1-channel type Ethernet and 1-channel type RS232C

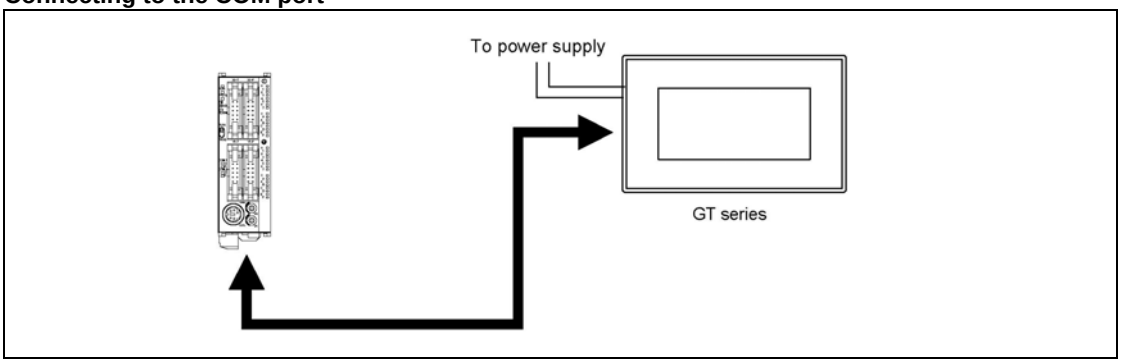
It cannot be connected with Ethernet.





4.2.4 RS232C Connection with FPΣ COM Port

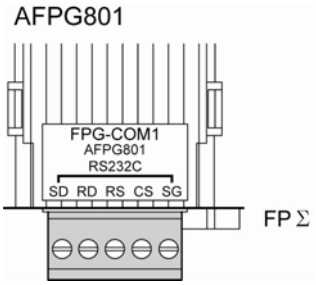
Connecting to the COM port

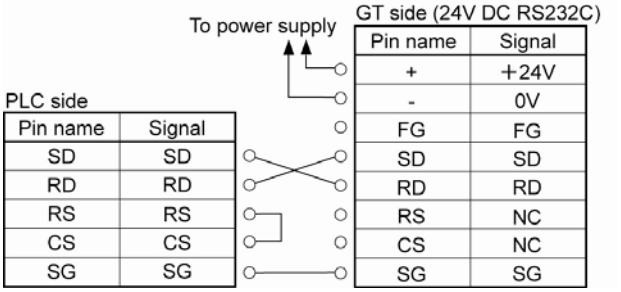


Usable models

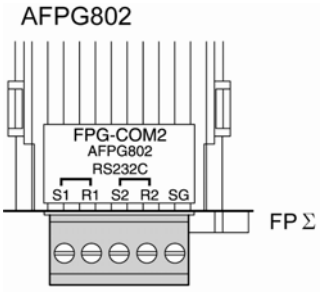
PLC	PLC communication cable	Programmable display (Excluding GT30)	
FPΣ	Loose-wire cable	5 V DC 24 V DC	RS232C type

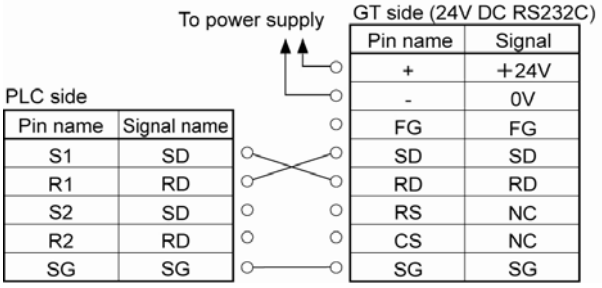
Connecting to the 1-channel type RS232C





Connecting to the 2-channel type RS232C

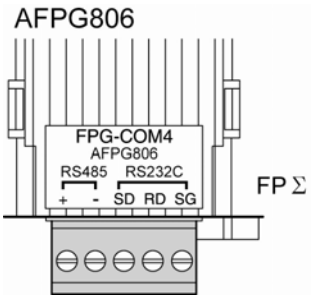


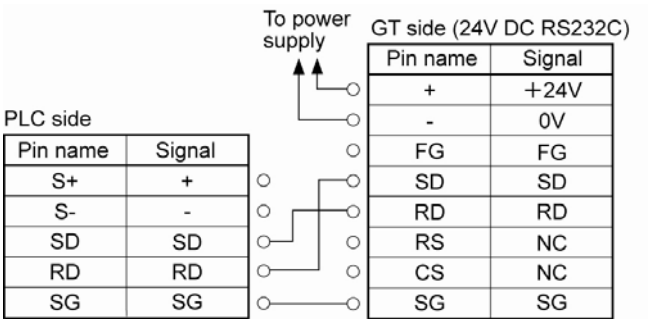


As for the connection to S2 and R2 for COM2, make the same connection as S1 and S2.

Connecting to the 1-channel type RS485 and 1-channel type RS232C

The connections with either one unit or two units are available.



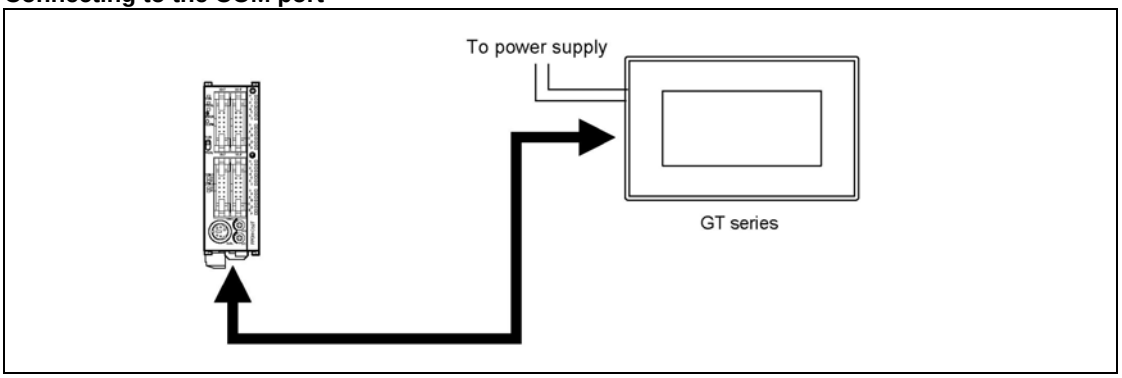


Pin name	Signal
S+	+
S-	-
SD	SD
RD	RD
SG	SG

Pin name	Signal
+	+24V
-	0V
FG	FG
SD	SD
RD	RD
RS	NC
CS	NC
SG	SG

4.2.5 RS232C Connection with FP0/FP0R COM Port

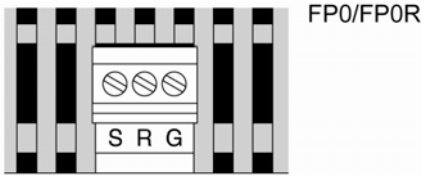
Connecting to the COM port

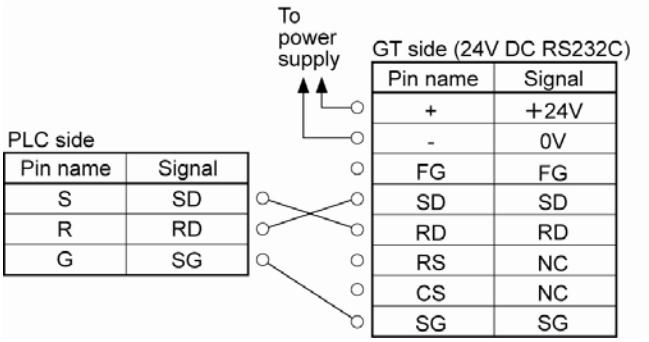


Usable models

PLC	PLC communication cable	Programmable display (Excluding GT30)	
FP0 FP0R	Loose-wire cable	5 V DC 24 V DC	RS232C type

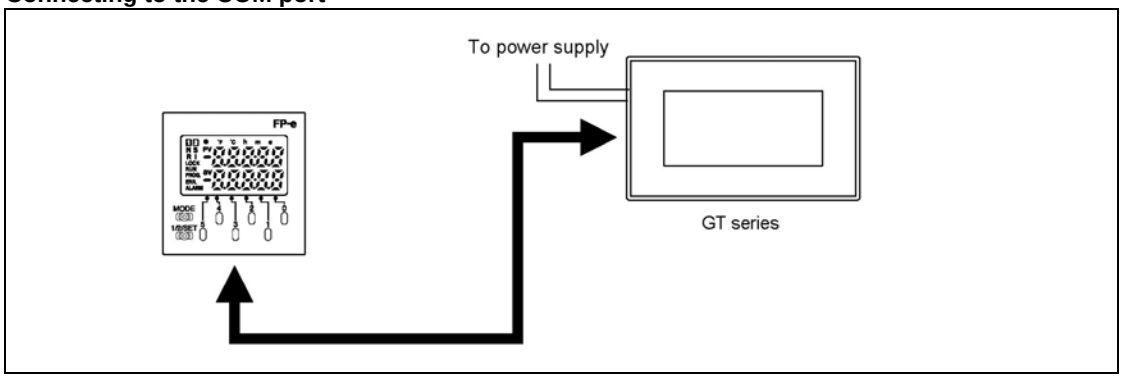
Connecting to the COM port of FP0/FP0R





4.2.6 RS232C Connection with FP-e COM Port

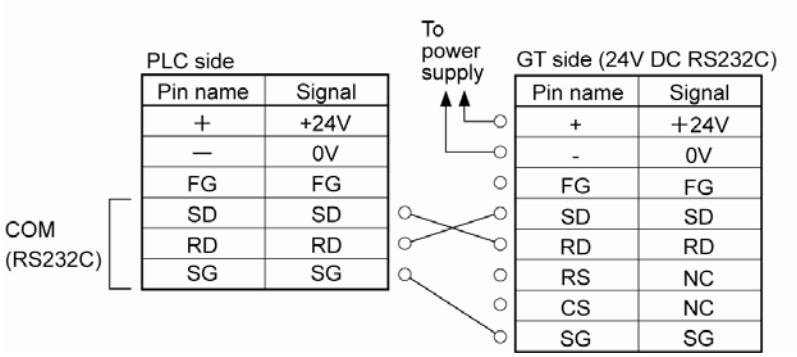
Connecting to the COM port



Usable models

PLC	PLC communication cable	Programmable display (Excluding GT30)	
FP-e	Loose-wire cable	5 V DC 24 V DC	RS232C type

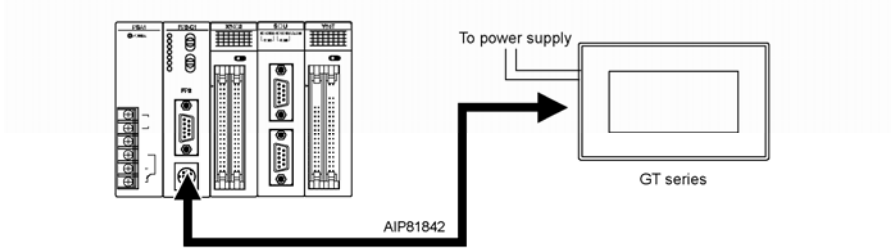
Connecting to the FP-e (RS232C)



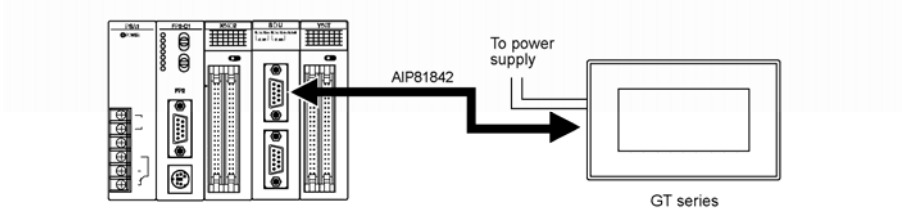
4.2.7 RS232C Connection with FP2/FP2SH COM Port

Connecting to the COM port

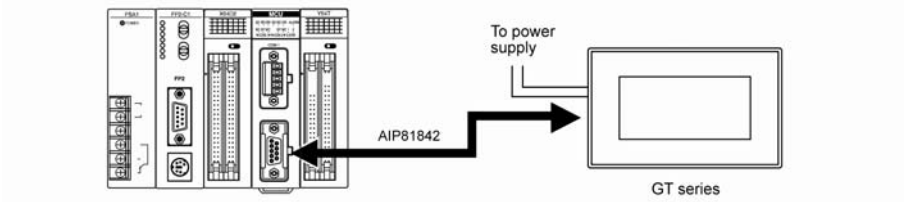
FP2/FP2SH CPU unit



FP2 Computer Communication Unit



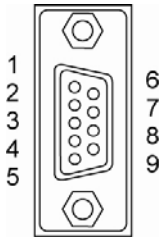
FP2 Multi Communication Unit



Usable models

PLC		PLC communication cable		Programmable display (Excluding GT30)	
FP2/FP2CH CPU unit		D-SUB 9-pin loose-wire cable	AIP81842	5 V DC 24 V DC	RS232C type
FP2 Computer Communication Unit					
FP2 Multi Communication Unit	Communication block FP2-CB232				

Connecting to the TOOL port



PLC side

Pin No.	Signal	Cable color (Dot mark)
1	FG	Brown (Black dot)
2	SD	Brown (Red dot)
3	RD	Yellow (Black dot)
4	RS	Yellow (Red dot)
5	CS	Green (Black dot)
6	N.C.	-
7	SG	Green (Red dot)
8	N.C.	-
9	ER	-

To power supply

GT side (24V DC RS232C)

Pin name	Signal
+	+24V
-	0V
FG	FG
SD	SD
RD	RD
RS	NC
CS	NC
SG	SG

4.3 RS422 Connection

4.3.1 Difference of Terminal blocks Between GT Models

Although the terminal blocks vary between the 5 V DC type and 24 V DC type, the connection method is the same.
The connection diagram is described with the terminal block for 24 V DC.

24 V DC type

GT side (24V DC RS422/485)

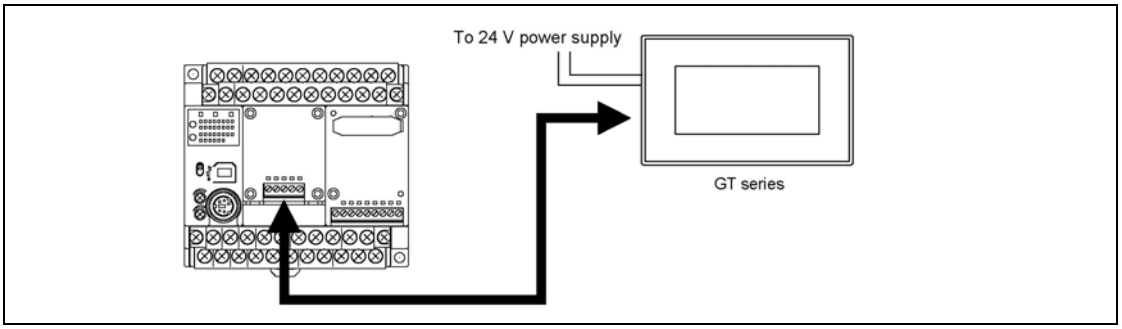
Pin name	Signal
+	+24V
–	0V
FG	FG
+SD	+SD
-SD	-SD
+RD	+RD
-RD	-RD
E	E

5 V DC-type GT01

GT side (5V DC RS422/485)

Pin name	Signal
+	+5V
–	0V
NC	NC
+SD	+SD
-SD	-SD
+RD	+RD
-RD	-RD
E	E

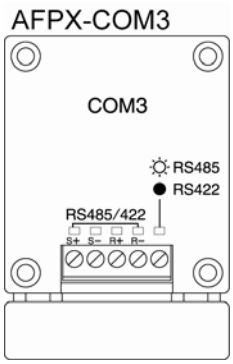
4.3.2 RS422 Connection with FP-X COM Port



Usable models

PLC		PLC communication cable	Programmable display (Excluding GT30)	
FP-X	AFPX-COM3	Loose-wire cable	5 V DC 24 V DC	RS422/RS485 type

Connecting to the FP-X Communicatoin cassette, 1-channel type RS485/RS422



To power supply

PLC side (Terminal block)

Pin name	Signal
S+	SD+
S-	SD-
R+	RD+
R-	RD-
Not used	

GT side (24V DC RS422/485)

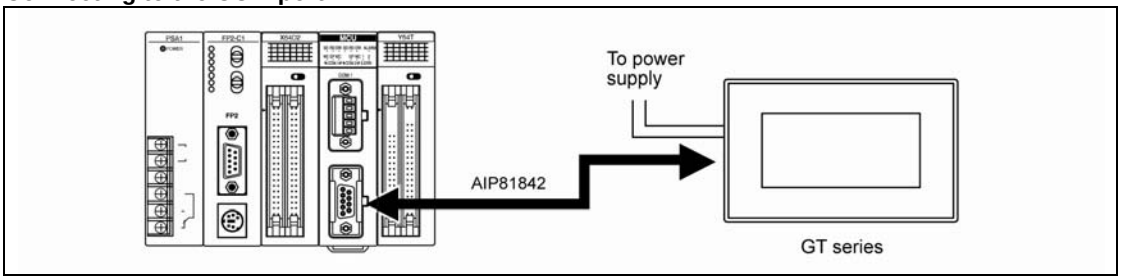
Pin name	Signal
+	+24V
−	0V
FG	FG
+SD	+SD
-SD	-SD
+RD	+RD
-RD	-RD
E	E

(Rear switch of cassette)

No. 1	OFF
No. 2	OFF
No. 3	OFF
No. 4	OFF

4.3.3 RS422 Connection with FP2/FP2SH COM Port

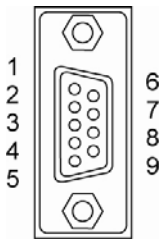
Connecting to the COM port



Usable models

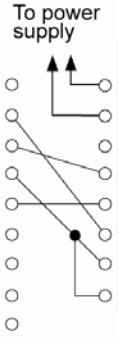
PLC		PLC communication cable		Programmable display (Excluding GT30)	
FP2 Multi Communication Unit	Communication block FP2-CB422	D-SUB 9-pin loose-wire cable	AIP81842	5 V DC 24 V DC	RS422/ RS485 type

Connecting to the FP2 Multi Communication Unit (MCU) + Communication block (RS422)



PLC side

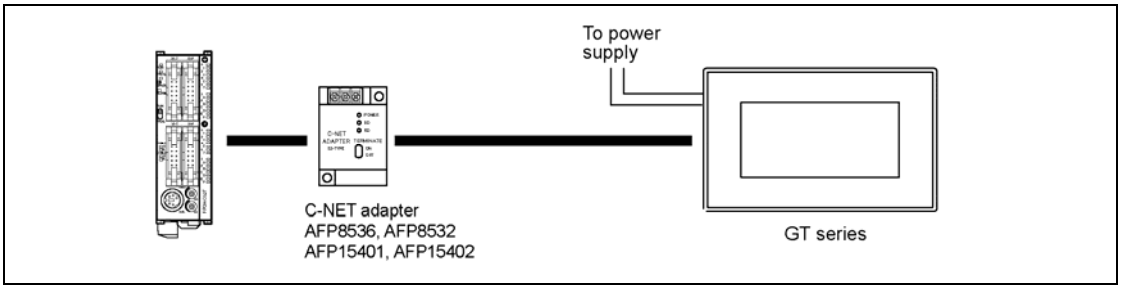
Pin No.	Signal	Cable color (Dot mark)
1	(NC)	Brown (Black dot)
2	SD+	Brown (Red dot)
3	RD+	Yellow (Black dot)
4	SD-	Yellow (Red dot)
5	RD-	Green (Black dot)
6	-	-
7	-	Green (Red dot)
8	-	-
9	-	-



GT side (24V DC RS422/485)

Pin name	Signal
+	+24V
−	0V
FG	FG
+SD	+SD
-SD	-SD
+RD	+RD
-RD	-RD
E	E

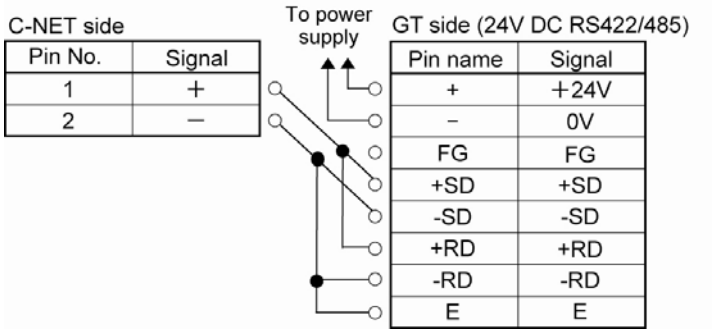
4.3.4 RS422 Connection with C-NET Adapter



Usable models

PLC	PLC communication cable		Programmable display (Excluding GT30)	
FP series	C-NET adapter	AFP8536 AFP8532 AFP15401 AFP15402	5 V DC 24 V DC	RS422/RS485 type

Conneciton method



Communication settings on the PLC side

Specify the setting to match with the setting for the GT using the tool software at the PLC side.

Reference: <4.5.3 How to Make Communication Settings Using the FPWIN GR>

C-NET adapter setting

Set the termination (TERMINATE) to on.

4.4 RS485 Connection

4.4.1 Difference of Terminal blocks Between GT Models

Although the terminal blocks vary between the 5 V DC type and 24 V DC type, the connection method is the same.
The connection diagram is described with the terminal block for 24 V DC.

24 V DC type

GT side (24V DC RS422/485)

Pin name	Signal
+	+24V
−	0V
FG	FG
+SD	+SD
-SD	-SD
+RD	+RD
-RD	-RD
E	E

5 V DC-type GT01

GT side (5V DC RS422/485)

Pin name	Signal
+	+5V
−	0V
NC	NC
+SD	+SD
-SD	-SD
+RD	+RD
-RD	-RD
E	E

Note) RS485 communicatoin is performed using the RS422 terminal blocks.

4.4.2 Usable GT models via 1:N connection

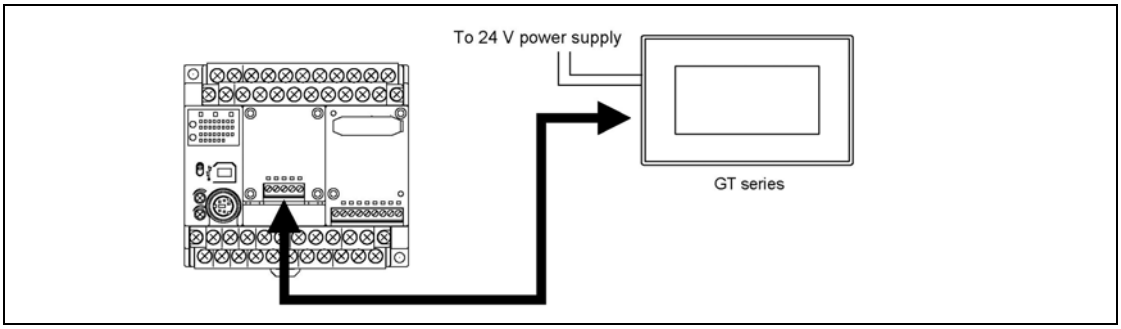
Usable GT models via 1:N connection

GT05 Ver.1.40 or later
GT12 Ver.1.00 or later
GT32 Ver.1.50 or later

Connection method
The GT configuration settings should be specified for performing 1:N communication.
There are two types of connection methods.

PLC multiple connection: Connect a PLC as a master with more than one GT units.
GT link function: Connect a GT as a master with more than one PLC units.

4.4.3 RS485 Connection with FP-X COM Port

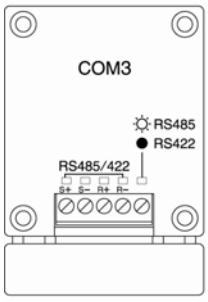


Usable models

PLC		PLC communication cable	Programmable display (Excluding GT30)	
FP-X	AFPX-COM3 AFPX-COM4 AFPX-COM6	Loose-wire cable	5 V DC 24 V DC	RS422/RS485 type

Connecting to the FP-X Communicatoin cassette, 1-channel type RS485/RS422

AFPX-COM3



1:1 communication

PLC side (Terminal block)

Pin name	Signal
S+	+
S-	-
R+	Not used
R-	Not used
Not used	Not used

To power supply

GT side (24V DC RS422/485)

Pin name	Signal
+	+24V
-	0V
FG	FG
+SD	+SD
-SD	-SD
+RD	+RD
-RD	-RD
E	E

Short circuit

(Cassette rear switch)

No.1	ON
No.2	ON
No.3	ON
No.4	ON

PLC multiple communication

PLC side, Terminal unit (Terminal block)

Pin name	Signal
S+	+
S-	-
R+	Not used
R-	Not used
Not used	Not used

PLC side, General unit (Terminal block)

Pin name	Signal
S+	+
S-	-
R+	Not used
R-	Not used
Not used	Not used

To power supply

GT side (24V DC RS422/485)

Pin name	Signal
+	+24V
-	0V
FG	FG
+SD	+SD
-SD	-SD
+RD	+RD
-RD	-RD
E	E

Short circuit

(Cassette rear switch)

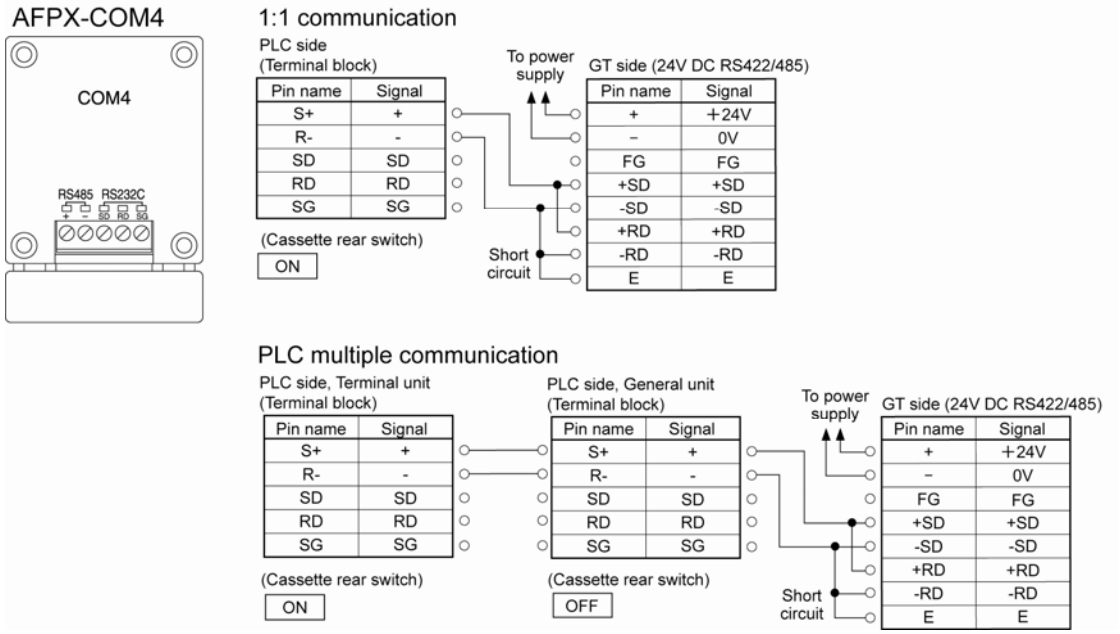
No.1	ON
No.2	ON
No.3	ON
No.4	ON

(Cassette rear switch)

No.1	ON
No.2	ON
No.3	ON
No.4	OFF

Note: Check the usable GT models for 1:N communication.

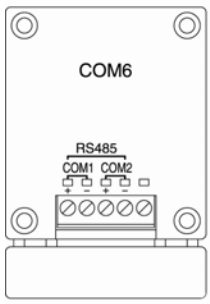
Connecting to the 1-channel type RS485 and 1-channel type RS422



Note: Check the usable GT models for 1:N communication.

Connecting to the 2-channel type RS485

AFPX-COM6



1:1 communication

PLC side
(Terminal block)

Pin name	Signal
+ (COM1)	+
- (COM1)	-
+ (COM2)	+
- (COM2)	-
Not used	Not used

(Cassette rear switch)

No.1	COM1:ON
No.2	COM2:ON
No.3	COM2 Baud rate
No.4	

To power supply

Short circuit

GT side (24V DC RS422/485)

Pin name	Signal
+	+24V
−	0V
FG	FG
+SD	+SD
-SD	-SD
+RD	+RD
-RD	-RD
E	E

Note) As for the connection to the "+" and "-" for the COM2, make the same connection as the "+" and "-" for the COM1.

PLC multiple communication

PLC side, Terminal unit
(Terminal block)

Pin name	Signal
+ (COM1)	+
- (COM1)	-
+ (COM2)	+
- (COM2)	-
Not used	Not used

(Cassette rear switch)

No.1	COM1:ON
No.2	COM2:ON
No.3	COM2 Baud rate
No.4	

PLC side, General unit
(Terminal block)

Pin name	Signal
+ (COM1)	+
- (COM1)	-
+ (COM2)	+
- (COM2)	-
Not used	Not used

(Cassette rear switch)

No.1	COM1:OFF
No.2	COM2:OFF
No.3	COM2 Baud rate
No.4	

To power supply

Short circuit

GT side (24V DC RS422/485)

Pin name	Signal
+	+24V
−	0V
FG	FG
+SD	+SD
-SD	-SD
+RD	+RD
-RD	-RD
E	E

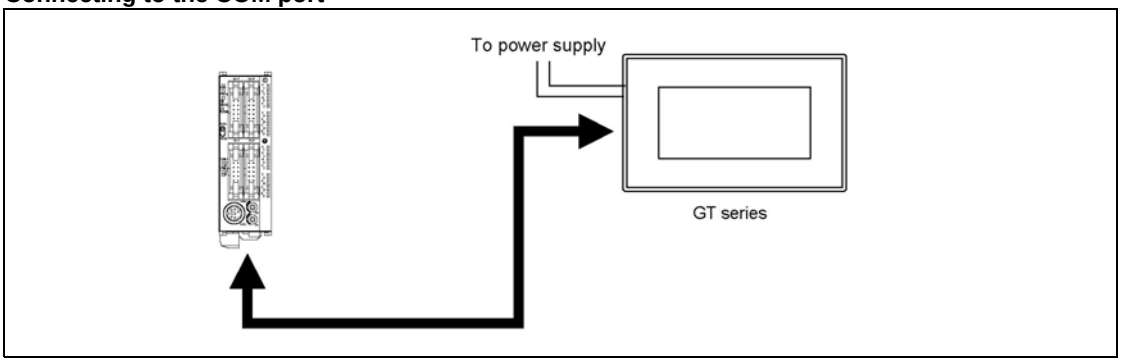
Note) As for the connection to the "+" and "-" for the COM2, make the same connection as the "+" and "-" for the COM1.

Note: Check the usable GT models for 1:N communication.

Reference: <FP-X User's Manual ARCT1F409E>
For information on the connection with RS485,
<4.4.7 Precautions When Communicating With RS485>

4.4.4 RS485 Connection with FPΣ COM Port

Connecting to the COM port

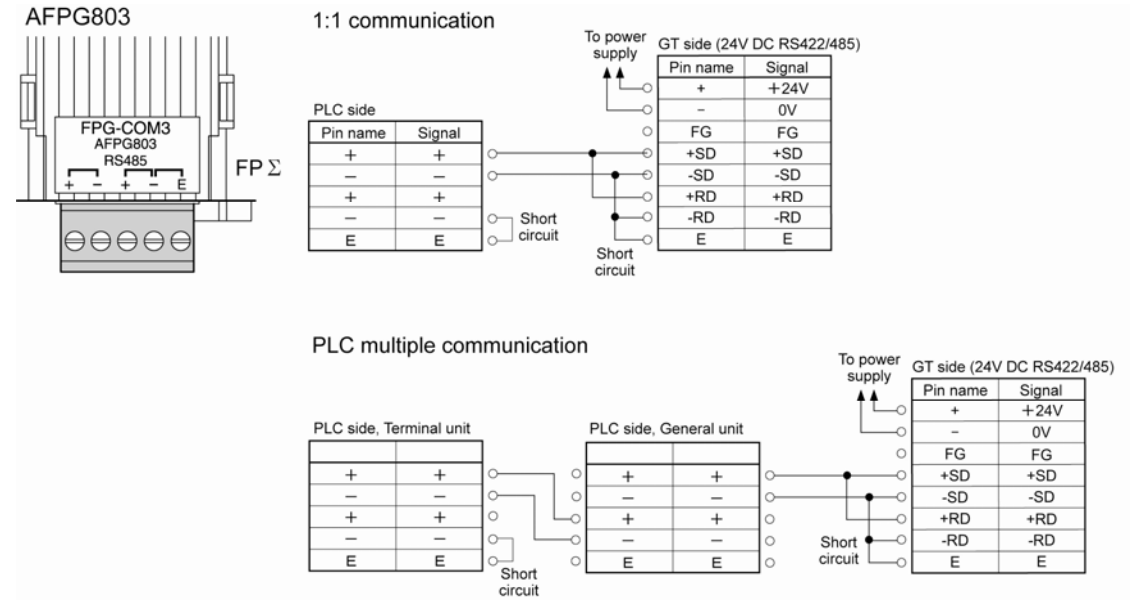


Usable models

PLC		PLC communication cable	Programmable display	
FPΣ	AFPG803	Loose-wire cable	5 V DC 24 V DC	RS422/RS485 type
	AFPG806			

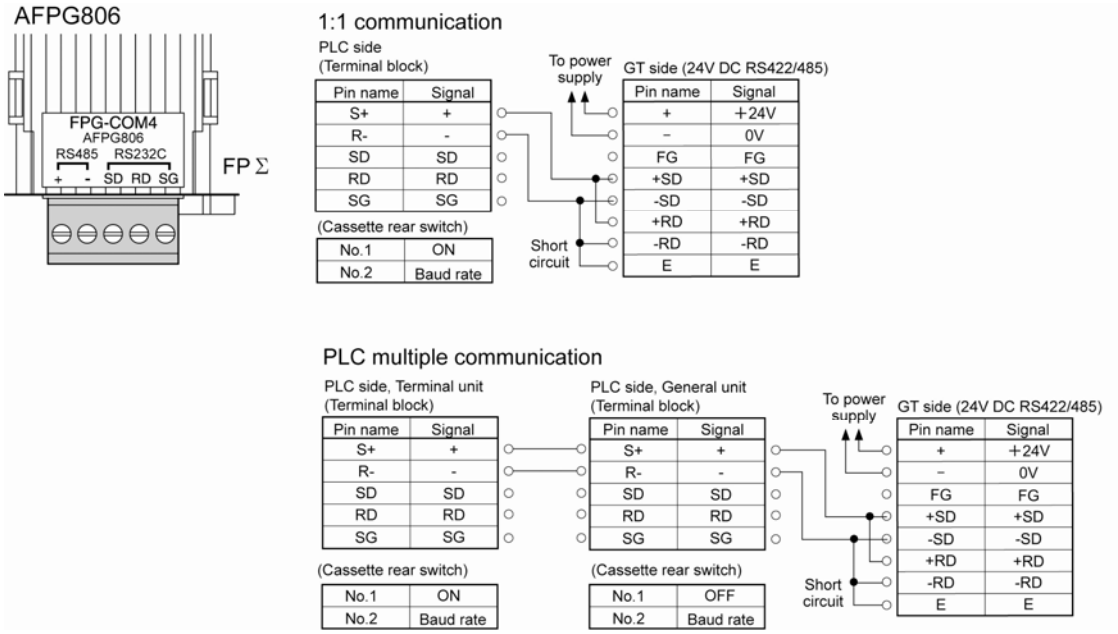
Connecting to the 1-channel type RS485

Reference: <4.5.3 How to Make Communication Settings Using the FPWIN GR>



Note: Check the usable GT models for 1:N communication.

Connecting to the 1-channel type RS485 and 1-channel type RS232C

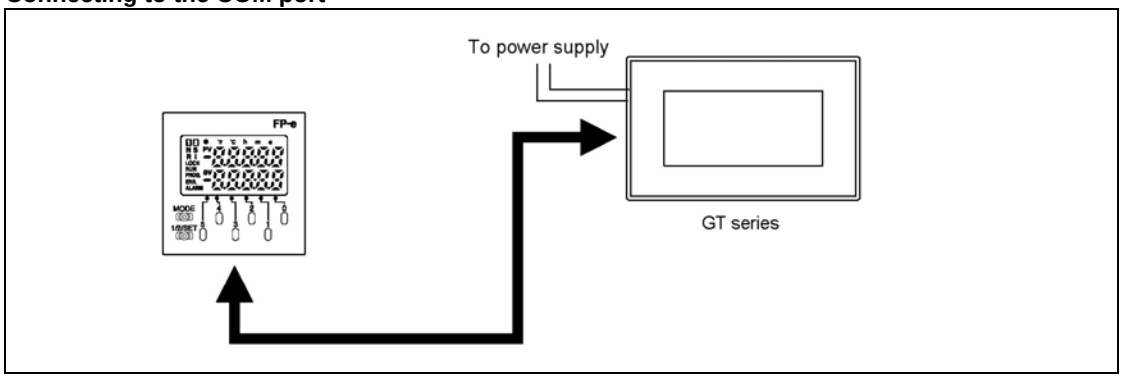


Note: Check the usable GT models for 1:N communication.

Reference: <FPΣ User's Manual ARCT1F333E>
For information on the connection with RS485,
<4.4.7 Precautions When Communicating With RS485>
<4.5.3 How to Make Communication Settings Using the FPWIN GR>

4.4.5 RS485 Connection with FP-e COM Port

Connecting to the COM port

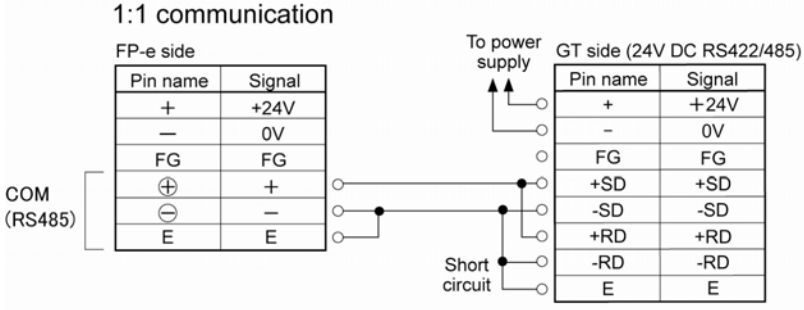


Usable models

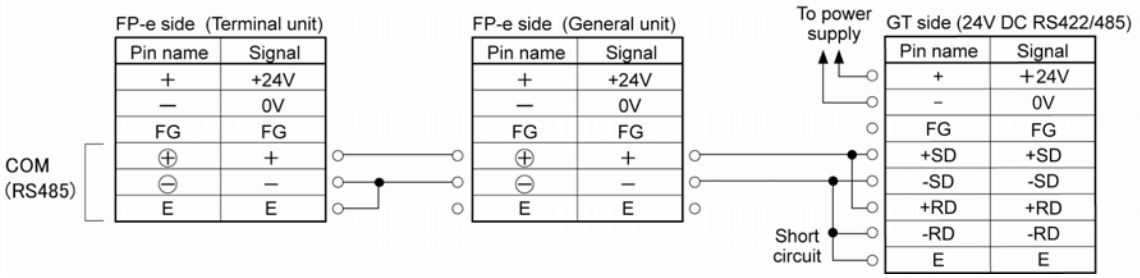
PLC		PLC communication cable	Programmable display (Excluding GT30)	
FP-e	RS485 type	Loose-wire cable	5 V DC 24 V DC	RS422/RS485 type

Connecting to the FP-e (RS485)

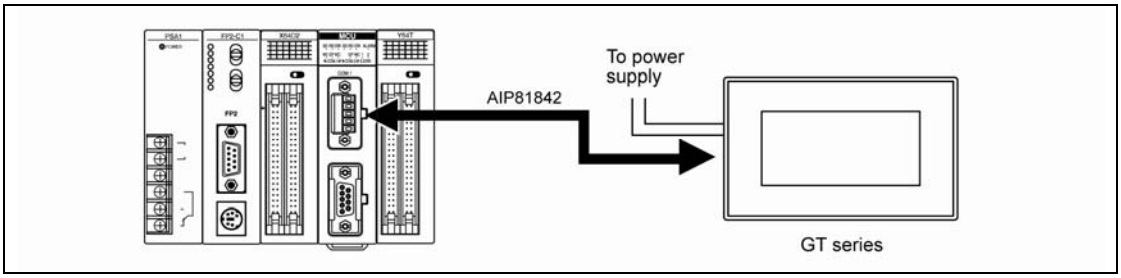
1:1 communication



PLC multiple communication



4.4.6 RS485Connection with FP2/FP2SH

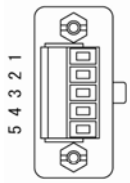


Usable models

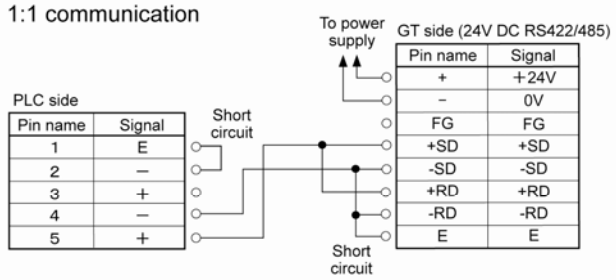
PLC		PLC communication cable	Programmable display (Excluding GT30)	
FP2 Multi Communication Unit	Communication block FP2-CB485	Loose-wire cable	5 V DC 24 V DC	RS422/ RS485 type

Connecting to the FP2 Multi Communication Unit (MCU) + Communication block (RS485)

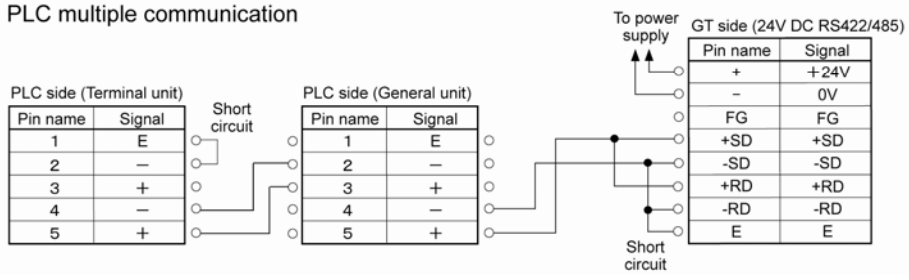
FP2-CB485



1:1 communication



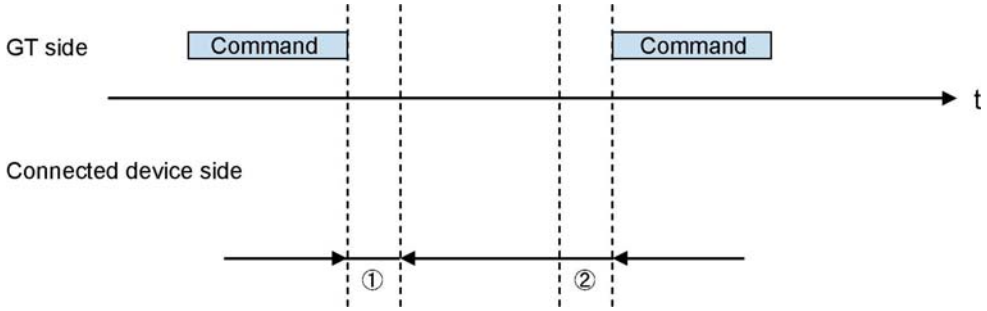
PLC multiple communication



Note: Check the usable GT models for 1:N communication.

4.4.7 Precautions When Communicating With RS485

When communication with the RS485, the transmission line for sending and receiving data is the same.



① **Time taken until the connected device sends a response after sending a command from the GT:**

If a response is sent too quickly, the GT may not be able to receive it. Adjust the time if necessary.
For our FP series FPΣ or FP-X, the time can be specified using the SYS1 instruction.

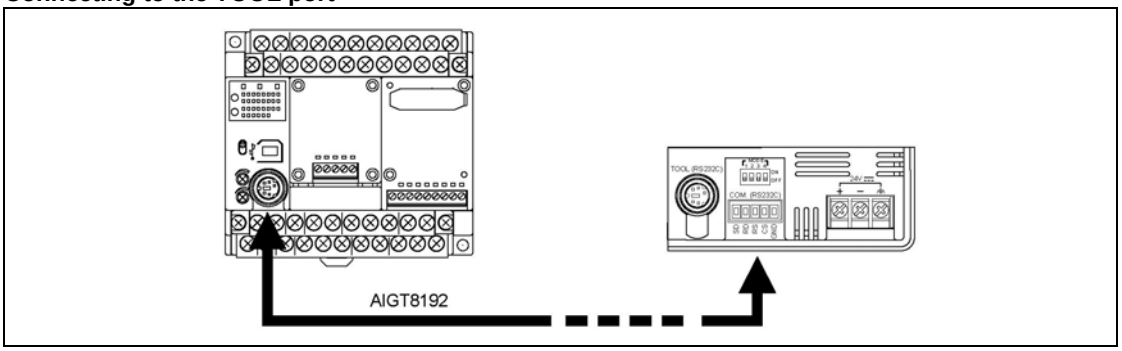
② **Time taken until the GT sends a next command after receiving a response:**

If a command is sent to quickly, the connected device may not be able to receive it.
The time can be specified in the delay time setting for transmission in the communication parameter of the GTWIN configuration setting.

4.5 Connection Method Between GT30 and PLCs

4.5.1 Connecting to the TOOL Port of FP-X

Connecting to the TOOL port

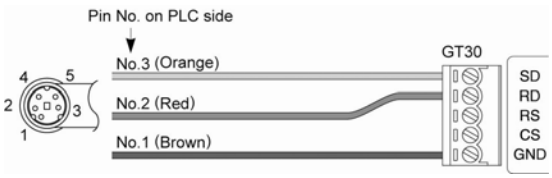


PLC	PLC communication cable	
FP-X	Mini-DIN 5-pin loose-wire cable	AIGT8192

Communication format settings

System register No.	Item	Value set
410	TOOL port unit number	1
412	Modem connection	No modem connection
413	Data length	8 bits
	Parity check	Yes, Odd
	Stop bits	1 bit
	End code	CR (Fixed)
	Start code	No STX (Fixed)
415	COM port1 Baud rate setting	9600 bps

Connecting to the TOOL port



PLC side

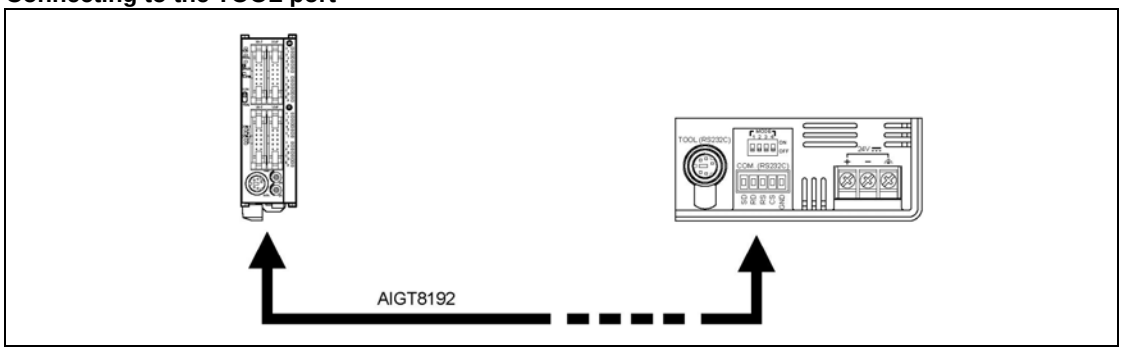
Pin No.	Signal name
1	SG
2	SD
3	RD
4	–
5	–

GT side (RS232C)

Pin No.	Signal name
1	SD
2	RD
3	RS
4	CS
5	GND

4.5.2 Connecting to the TOOL Port of FPΣ

Connecting to the TOOL port

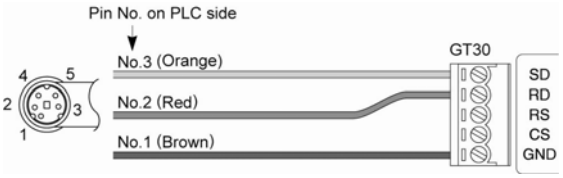


PLC	PLC communication cable	
FPΣ	Mini-DIN 5-pin loose-wire cable	AIGT8192

Communication format settings

System register No.	Item	Value set
410	TOOL port unit number	1
412	Modem connection	No modem connection
413	Data length	8 bits
	Parity check	Yes, Odd
	Stop bits	1 bit
	End code	CR (Fixed)
	Start code	No STX (Fixed)
415	TOOL port Baud rate setting	9600 bps

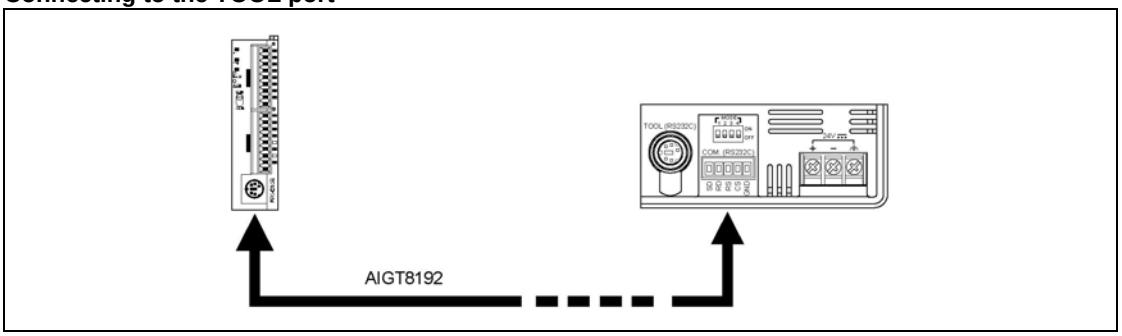
Connecting to the TOOL port



PLC side		GT side (RS232C)	
Pin No.	Signal name	Pin No.	Signal name
1	SG	1	SD
2	SD	2	RD
3	RD	3	RS
4	–	4	CS
5	–	5	GND

4.5.3 Connecting to the TOOL Port of FP0

Connecting to the TOOL port



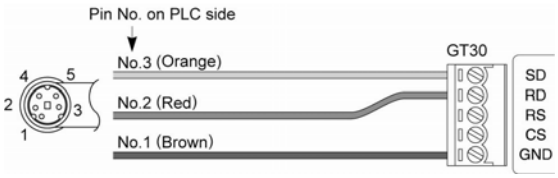
PLC	PLC communication cable	
FP0	Mini-DIN 5-pin loose-wire cable	AIGT8192

Communication format settings

System register No.	Item	Value set	System register value
410	Unit number	1	K1
411	Data length	8 bits	H0.
	Modem connection	No modem connection	
414	Baud rate setting	9600 bps	H010X Note) X is 0 to 6.

Note) To set 19200 bps for both the COM port and the TOOL port, “H0100” should be set.

Connecting to the TOOL port



PLC side

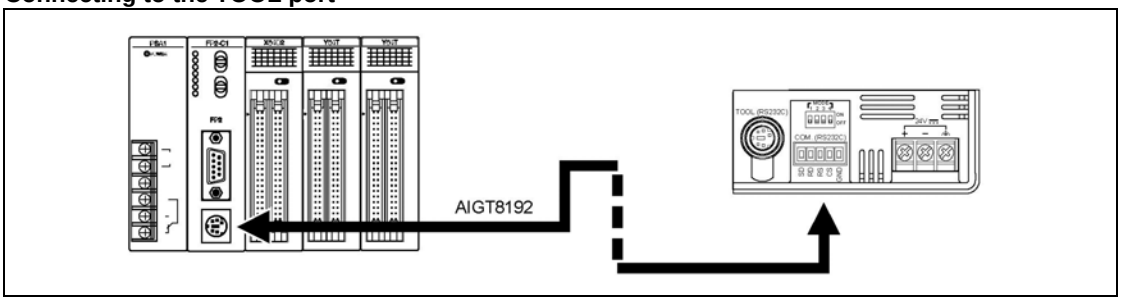
Pin No.	Signal name
1	SG
2	SD
3	RD
4	—
5	—

GT side (RS232C)

Pin No.	Signal name
1	SD
2	RD
3	RS
4	CS
5	GND

4.5.4 Connecting to the TOOL Port of FP2/FP2SH

Connecting to the TOOL port

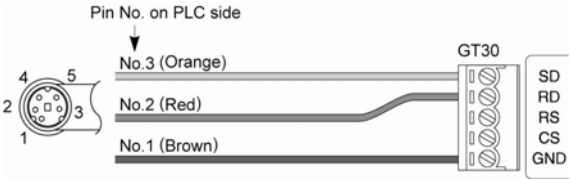


PLC	PLC communication cable	
FP2/FP2SH	Mini-DIN 5-pin loose-wire cable	AIGT8192

Communication format settings

System register No.	Item	Value set
410	Unit number	1
411	Data length	8 bits
	Modem connection	No modem connection
414	Baud rate setting	9600 bps

Connecting to the TOOL port



PLC side

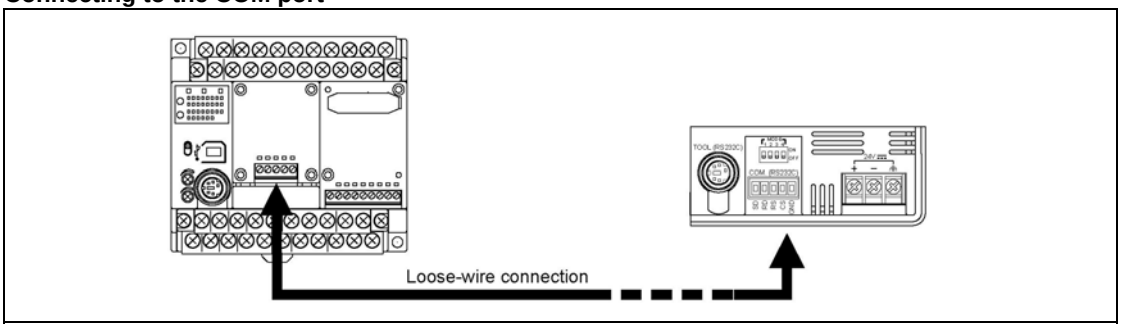
Pin No.	Signal name
1	SG
2	SD
3	RD
4	–
5	–

GT side (RS232C)

Pin No.	Signal name
1	SD
2	RD
3	RS
4	CS
5	GND

4.5.5 Connecting to the COM Port of FP-X

Connecting to the COM port



PLC	PLC communication cable
FP-X	Loose-wire cable

Communication format settings

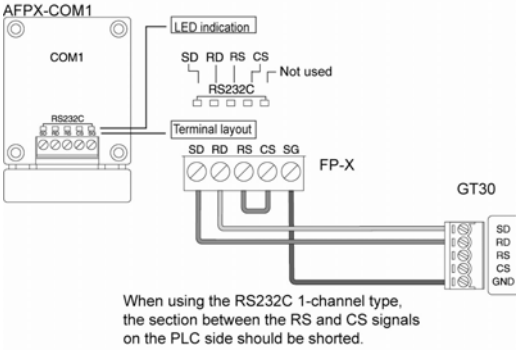
When using the COM port 1

System register No.	Item	Value set
410	COM port 1 Unit number	1
412	COM port 1 Communication mode	Computer link No modem connection
413	Data length	8 bits
	Parity check	Yes, Odd
	Stop bits	1 bit
	End code	CR (Fixed)
	Start code	No STX (Fixed)
415	COM port 1 Baud rate setting	9600 bps

When using the COM port 2

System register No.	Item	Value set
4113	COM port 2 Unit number	1
412	COM port 2 Communication mode	Computer link No modem connection
414	Data length	8 bits
	Parity check	Yes, Odd
	Stop bits	1 bit
	End code	CR (Fixed)
	Start code	No STX (Fixed)
415	COM port 2 Baud rate setting	9600 bps

Connecting to the 1-channel RS232C type



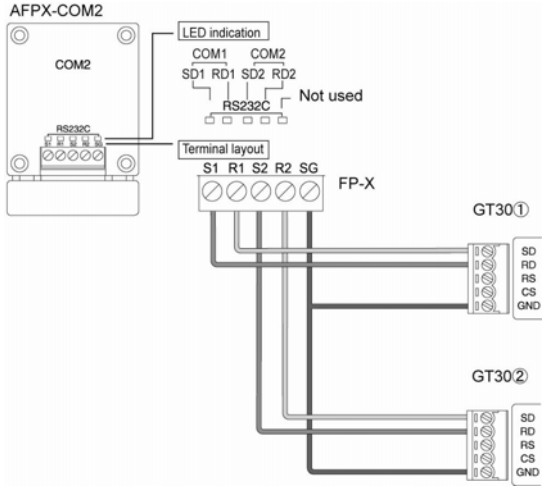
PLC side

Pin name	Signal name
SD	SD
RD	RD
RS	RS
CS	CS
SG	SG

GT side (RS232C)

Pin No.	Signal name
1	SD
2	RD
3	RS
4	CS
5	GND

Connecting to the 2-channel RS232C type



PLC side

Pin name	Signal name
S1	SD
R1	RD
S2	SD
R2	RD
SG	SG

GT side1 (RS232C)

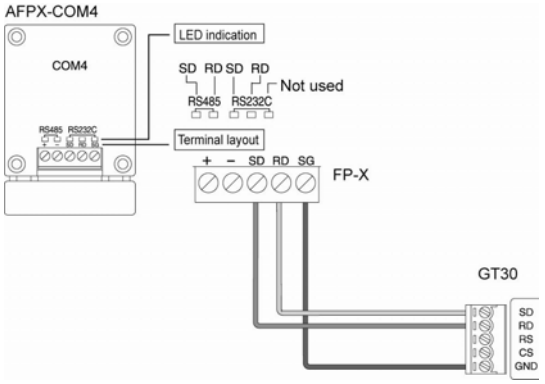
Pin No.	Signal name
1	SD
2	RD
3	RS
4	CS
5	GND

GT side2 (RS232C)

Pin No.	Signal name
1	SD
2	RD
3	RS
4	CS
5	GND

Connecting to the 1-channel RS485 and 1-channel RS232C type

Note) The GT30 cannot be connected using the RS485.



PLC side

Pin name	Signal name
S+	+
S-	-
SD	SD
RD	RD
SG	SG

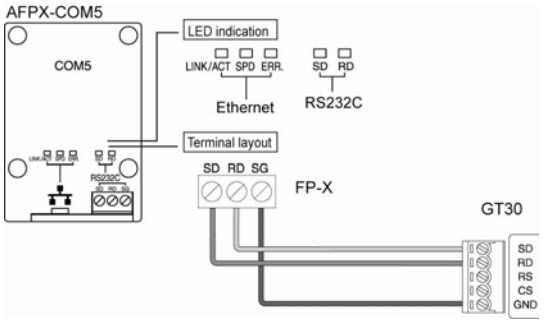
*Turn on the switch at the back of the cassette.

GT side (RS232C)

Pin No.	Signal name
1	SD
2	RD
3	RS
4	CS
5	SG

Connecting to the 1-channel Ethernet and 1-channel RS232C type

Note) The connection with Ethernet is not available.



PLC side

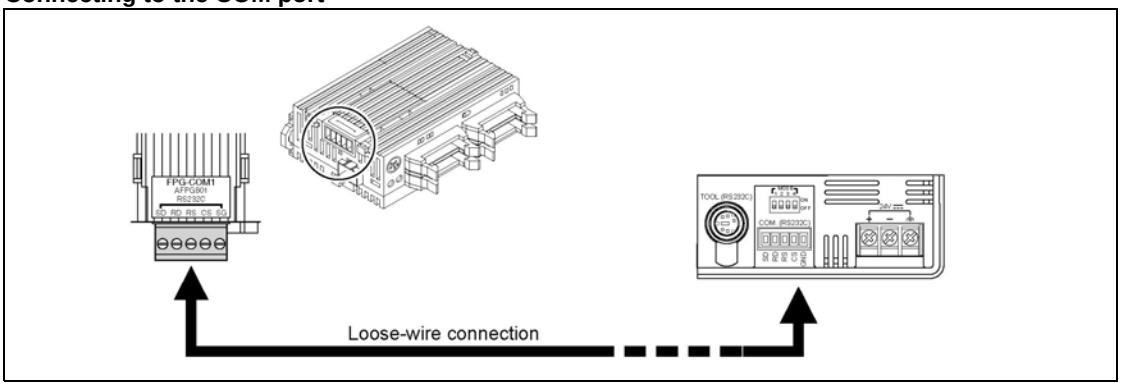
Pin name	Signal name
SD	SD
RD	RD
SG	SG

GT side (RS232C)

Pin No.	Signal name
1	SD
2	RD
3	RS
4	CS
5	GND

4.5.6 Connecting to the COM Port of FPΣ

Connecting to the COM port



PLC	PLC communication cable
FPΣ	Loose-wire cable

Communication format settings

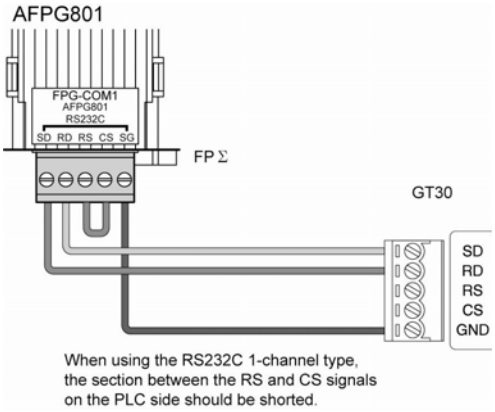
When using the COM port 1

System register No.	Item	Value set
410	COM port 1 Unit number	1
412	COM port 1 Communication mode	Computer link No modem connection
413	Data length	8 bits
	Parity check	Yes, Odd
	Stop bits	1 bit
	End code	CR (Fixed)
	Start code	No STX (Fixed)
415	COM port 1 Baud rate setting	9600 bps

When using the COM port 2

System register No.	Item	Value set
4113	COM port 2 Unit number	1
412	COM port 2 Communication mode	Computer link No modem connection
414	Data length	8 bits
	Parity check	Yes, Odd
	Stop bits	1 bit
	End code	CR (Fixed)
	Start code	No STX (Fixed)
415	COM port 2 Baud rate setting	9600 bps

Connecting to the 1-channel RS232C type



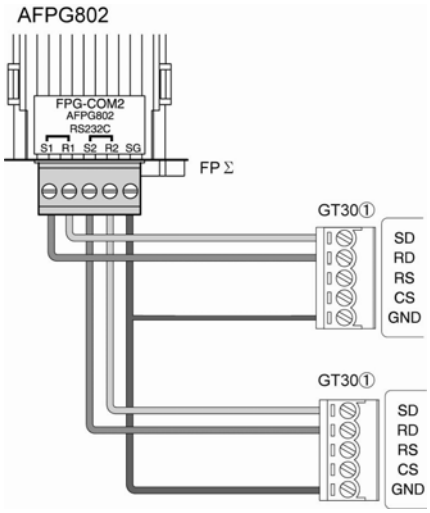
PLC side

Pin name	Signal name
SD	SD
RD	RD
RS	RS
CS	CS
SG	SG

GT side (RS232C)

Pin No.	Signal name
1	SD
2	RD
3	RS
4	CS
5	GND

Connecting to the 1-channel RS232C type



PLC side

Pin name	Signal name
S1	SD
R1	RD
S2	SD
R2	RD
SG	SG

GT side1 (RS232C)

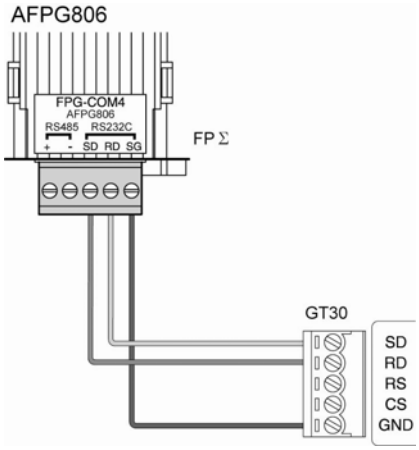
Pin No.	Signal name
1	SD
2	RD
3	RS
4	CS
5	GND

GT side2 (RS232C)

Pin No.	Signal name
1	SD
2	RD
3	RS
4	CS
5	GND

1-channel RS485 and 1-channel RS232C combination type

Note) The GT30 cannot be connected using the RS485.



PLC side

Pin name	Signal name
S+	+
S-	-
SD	SD
RD	RD
SG	SG

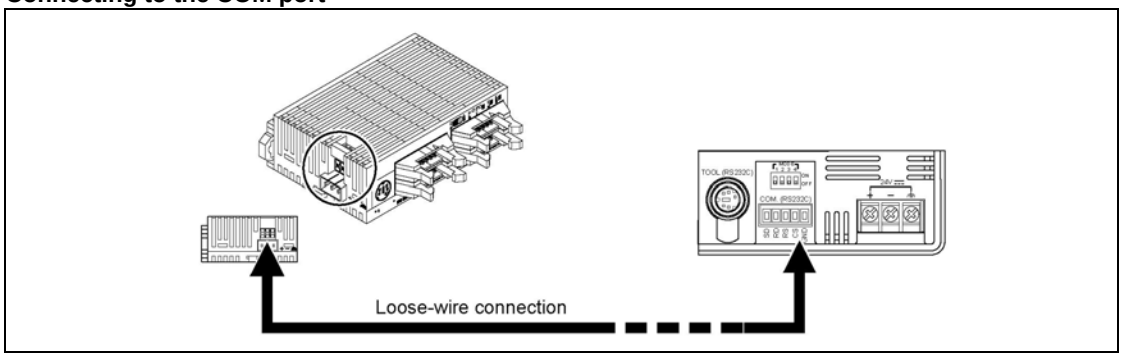
GT side (RS232C)

Pin No.	Signal name
1	SD
2	RD
3	RS
4	CS
5	GND

* Turn on the switch of No. 1 at the back of the cassette.

4.5.7 Connecting to the COM Port of FP0

Connecting to the COM port



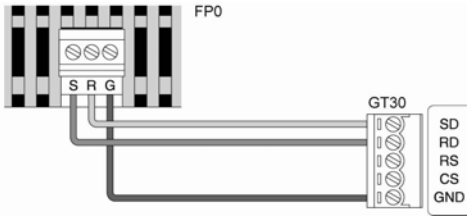
PLC	PLC communication cable
FP0	Loose-wire cable

Communication format settings

System register No.	Item	Value set	System register value
412	Selection of application of RS232C port	Computer link	K1
413	Data length	8 bits	K3
	Parity check	Yes, Odd	
	Stop bits	1 bit	
	End code	CR (Fixed)	
	Start code	No STX (Fixed)	
414	Baud rate setting	9600 bps	H0*00 Note)
415	Unit number	1	K1
416	Modem connection	No modem connection	H0

Note) To set 19200 bps for both the COM port and the TOOL port, “H0100” should be set.

Connecting to the COM port



PLC side

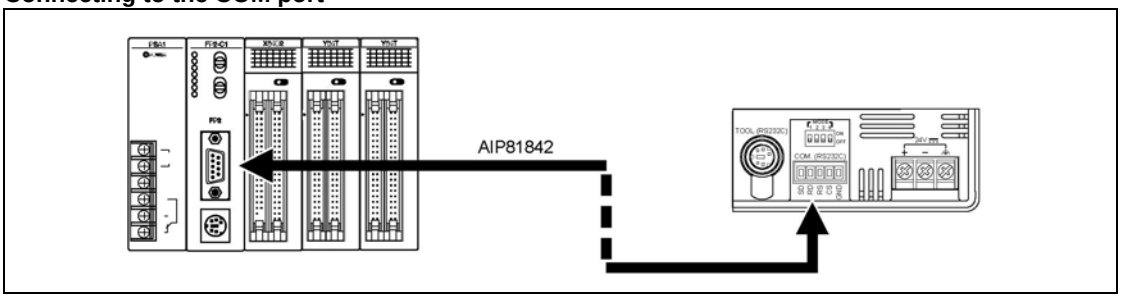
Pin name	Signal name
S	SD
R	RD
G	SG

GT side (RS232C)

Pin No.	Signal name
1	SD
2	RD
3	RS
4	CS
5	GND

4.5.8 Connecting to the COM Port of FP2/FP2SH

Connecting to the COM port

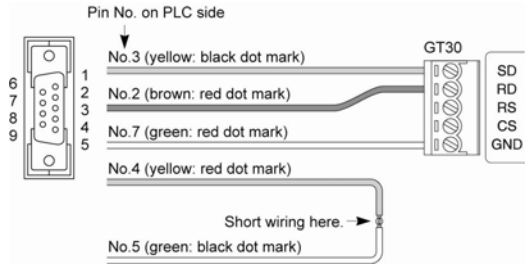


PLC	PLC communication cable	
FP2/FP2SH	D-SUB 9-pin loose-wire cable	AIP81842

Communication format settings

System register No.	Item	Value set
412	Selection of application of RS232C port	Computer link
413	Data length	8 bits
	Parity check	Yes, Odd
	Stop bits	1 bit
	End code	CR (Fixed)
	Start code	No STX (Fixed)
414	Baud rate setting	9600 bps
415	Unit number	1
416	Modem connection	No modem connection

Connecting to the COM port



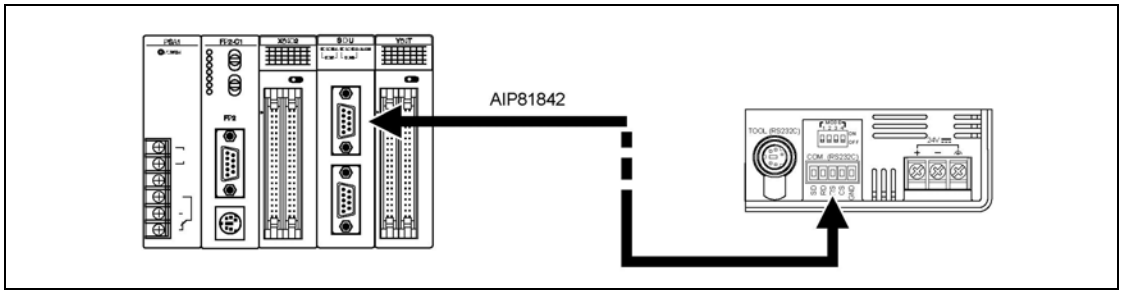
PLC side

Pin No.	Signal name
1	FG
2	SD
3	RD
4	RS
5	CS
6	N.C.
7	SG
8	N.C.
9	ER

GT side (RS232C)

Pin No.	Signal name
1	SD
2	RD
3	RS
4	CS
5	GND

4.5.9 Connecting to FP2 Computer Communication Unit



PLC	PLC communication cable	
FP2	D-SUB 9-pin loose-wire cable	AIP81842

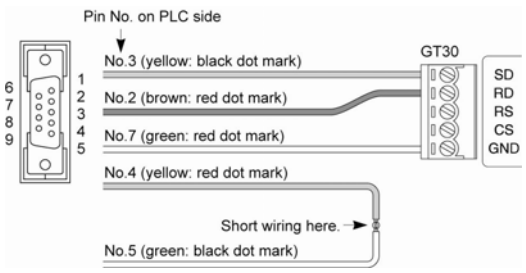
DIP switch settings on the backside of FP2 computer communication unit

SW No.	Setting contents	Value set	Switch status
1	Reserved for system		ON
2	COM1 baud rate	9600 bps	OFF
3			ON
4	COM1 data length	8 bits	ON
5	Reserved for system		ON
6	COM2 baud rate	9600 bps	OFF
7			ON
8	COM2 data length	8 bits	ON

* If both serial ports of the FP2 computer communication unit are being used, each port should be set individually as shown at theleft.

With the FP2 CCU, the parity check is fixed at “Odd”, and the number of stop bits is fixed at “1 bit”.

Connecting to the FP2 computer communication unit (CCU)



PLC side

Pin No.	Signal name
1	FG
2	SD
3	RD
4	RS
5	CS
6	N.C.
7	SG
8	N.C.
9	ER

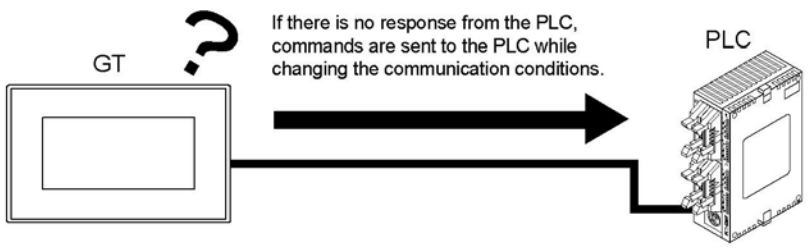
GT side (RS232C)

Pin No.	Signal name
1	SD
2	RD
3	RS
4	CS
5	GND

4.6 Connection With a PLC

4.6.1 Automatic Communication Settings Function

After turning on the power supply, if there is not response from the PLC connected to the GT, the GT switches to the automatic setting mode for the communication conditions. In the automatic setting mode, commands are sent to the PLC while changing the communication conditions in the sequence shown below.



① 9600 bps, 8 bits, odd parity, 1 stop bit
② 19200 bps, 8 bits, odd parity, 1 stop bit
③ 115200 bps, 8 bits, odd parity, 1 stop bit
④ Communication conditions set in GTWIN Configuration settings

The GT, in automatic setting mode, continues to repeat steps ① to ④ until there is a response from the PLC. While it is repeating there steps, it is in the “Standby” mode under “Configuration” → “Communication Parameters” → “Handle Communication Error” on GTWIN.

Reference: For the information on the setting method, <Chapter 5 GT Configuration Settings>

Explanation of this function:

- Conditions when the automatic settings mode is in effect
  If communication is attempted the specified number of times and there is no response from the PLC, the GT goes into the automatic settings mode. The number of attempts is specified using the “No. of Retries” parameter under “GT Configuration” → “Communication Parameters” → “Handle Communication Error” on GTWIN.
- Automatically set communication conditions
  In the automatic settings mode, if there is a response from the PLC, subsequent communication is carried out under conditions matching the response. The main unit configuration settings are not updated, however, even if the communication parameters are different from those of the main unit configuration settings.

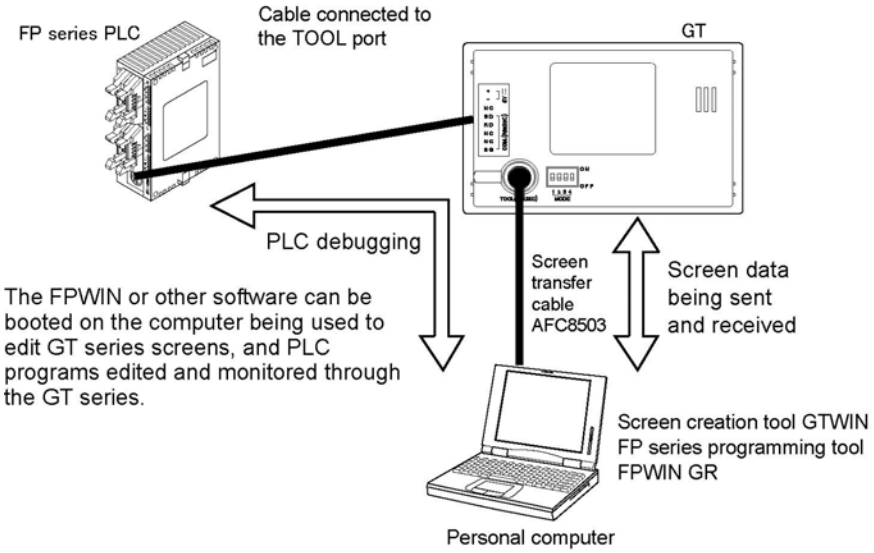
Note:

- An error response from the PLC is taken as a response, and the GT does not go into the automatic settings mode.
- If the unit is connected to the COM port of the FP0/FP1/FP2/FP2SH/FP-M, communication between the FP device and the PLC will not be possible if the target usage of the RS232C port has not been set to “Computer Link”. Always set the setting on the PLC side to match “Computer Link”.
- The automatic communication settings function cannot be used for the communcation at 230400 bps on the GT01, GT11 or GT21.

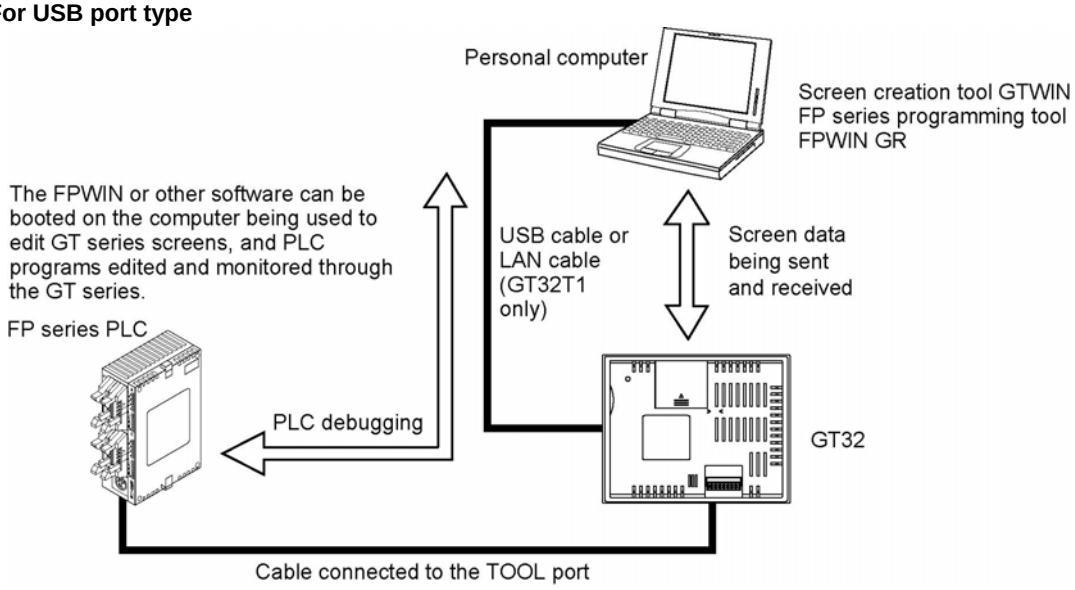
4.6.2 Through Function

With the GT series, communication can be set to take place automatically between the COM port of a GT and TOOL port of a PLC in a “through function”. When the FP series tool software installed in the computer connected to the GT series as shown below is booted, PLC programs can be edited through the GT series. The through function does not require any special settings, and is always in the standby mode.

For TOOL port type



For USB port type

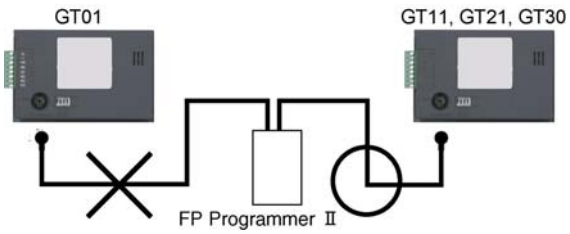


Note:

- **Precautions when using the through function**
  The system should be set up so that the Timeout period in the FP series software (FPWIN) (A) is larger than the waiting time for communication retries of the GT COM port (B), meaningn (A) > (B). If the system is set up so that A = B or A < B, the through function will not work properly.
  When the baud rate of the GT TOOL port is 230400 bps, the through function cannot be used. Communicate at 115200 bps or lower for using the throught function.
- For the USB port type, the OS installed in the connected computer must be Windows®2000 or later.

- **Restrictions on COM port connections**
  When connecting the GT01 to the COM port of a PLC, a separate external supply must be provided.

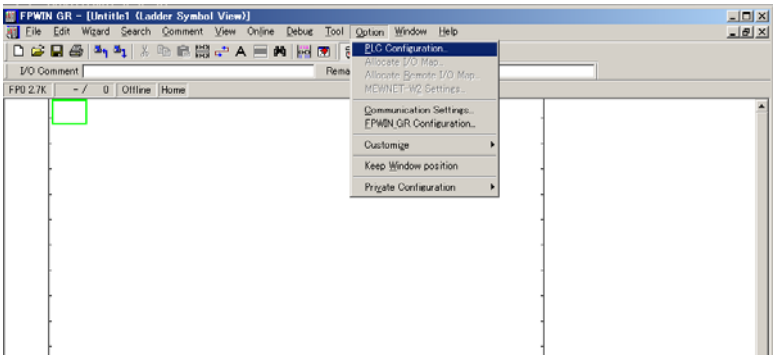
- **When using the FP programmer II**
  An FP Programmer II cannot be connected to the tool port of the GT01. It can be connected to the GT11, GT21 and GT30. The GT32 cannot be connected to the FP programmer II as it is connected with USB or Ethernet.



4.6.3 How to Make Communication Settings Using the FPWIN GR

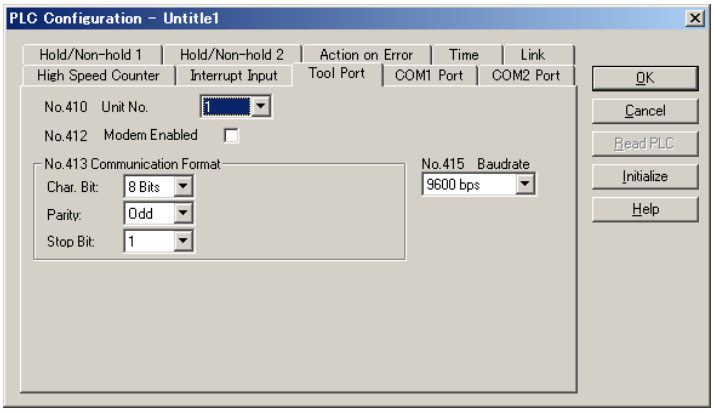
Please read below to make PLC communication settings using the FPWIN GR.

1. Select “PLC system register setting” from the Option menu (O).

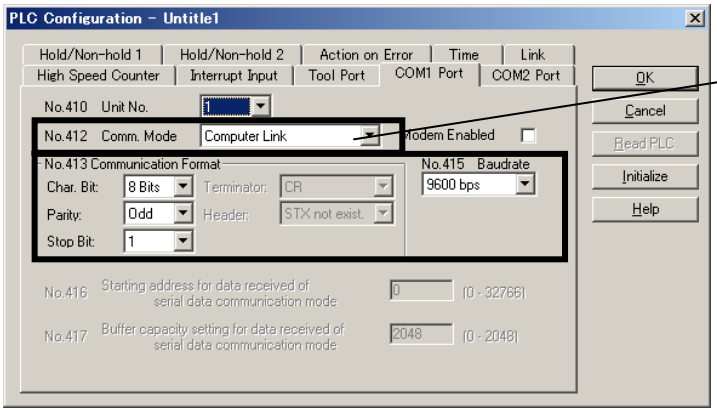


2. The window below will be displayed.

Select “Tool port setting” when connecting to the tool port or “COM port setting” when connecting to the COM port. Please match the transfer format and transmission speed settings to those of the GT.



In addition to the transfer format and transmission speed settings, set the communication mode to “Computer link” when using the COM port.



Select “Computer Link”.

Chapter 5

GT Configuration Settings

5.1 GT Configuration Settings

5.1.1 Factory Default of GT Configuration Settings

The GT has an internal file called the “Configuration file”, which is used to determine various operating environment parameters. When the GT is shipped from the factory, the settings listed below are set for the parameters in the configuration setting file.

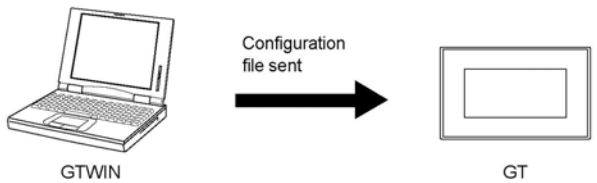
Factory settings of TOOL port communication parameter
TOOL port
Baud rate: 115200 bps
Data length: 8 bits
Stop bit: 1 bit
Parity: Odd

Note:
There is no TOOL port setting for USB port type/Ethernet type.
Only communication with USB port or Ethernet port is available.

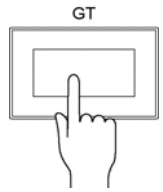
5.1.2 Changing GT Configuration Settings

There are the following two methods to change the GT configuration settings.

1. Entering configuration settings from GTWIN screen creation tool
With this method, GT configuration settings are entered from GTWIN screen creation tool, and the GT configuration file is sent to the GT. Most items can be set using this method.



2. Entering configuration settings fron the system menu
Some of the settings, such as the communication parameters, the internal clock, and adjustments of the liquid crystal display contrast, can be set using the system menu of the GT. Settings are entered using the touch switches on the front of the panel.



List of GT Configuration Settings A: Available N/A: Not available

Setting items			GT01	GT05	GT11	GT12	GT21	GT30	GT32
GTWIN Configuration settings	Basic Setup	Title	A	A	A	A	A	A	A
		Basic communication area to PLC	A	A	A	A	A	A	A
	Communication parameter	COM Port	A	A	A	A	A	A	A
		TOOL Port	A	N/A	A	N/A	A	A	N/A
	PLC Multiple Connection		N/A	A	N/A	A	N/A	N/A	A
	Auto paging		A	A	A	A	A	A	A
	Startup screen settings		A	A	A	A	A	A	A
	Setup 1	Clock	A *1) 2)	A	A *2)	A	A *2)	A *2)	A
		Backlight control (Auto-off)	A	A	A	A	A	A	A
		Touch sounds	A	A	A	A	A	A	A
		Battery error display	N/A	A	A	A	A	A	A
		File compression	A	A	A	A	A	A	A
		Press two touch switches	N/A	N/A	N/A	N/A	N/A	A	N/A
		Multi-language exchange	A	A	A	A	A	N/A	A
		Backlight brightness setting	A	A	A	A	A	N/A	N/A
		Contrast adjustment	A	N/A	A	N/A	A	N/A	N/A
	Setup 2	Through function	A	A *6)	A	A *6)	A	A	A *6)
		SD card menu	N/A	A	N/A	A	N/A	N/A	A
	Hold device value	Hold PLC device value	N/A	A	A	A	A	A	A
		Hold GT device value	N/A	A	A	A	A	A	A
	Recipe		A	A	A	A	A	A	A
	Alarm history		N/A	A	A	A	A	A	A
	Line graph		A	A	A	A	A	A	A
	Sound		N/A	N/A	N/A	N/A	N/A	N/A	A *3)
	Operation security		N/A	A	N/A	A	N/A	N/A	A
	GT link		N/A	A	N/A	A	N/A	N/A	A
System menu (Setting mode)	Contrast adjustment		A	A	A	A	A	A	A *4)
	Brightness adjustment		A	A	A	A	A	N/A	N/A
	Touch switch adjustment		A	A	A	A	A	N/A	A
	SRAM clear		A	A	A	A	A	A	A
	FROM clear		A	A	A	A	A	A	A
	Copy function		A	N/A	A	N/A	A	N/A	N/A
	COM port setting		A	A	A	A	A	A	A
	TOOL port setting		A	N/A	A	N/A	A	A	N/A
	Ethernet port setting		N/A	N/A	N/A	N/A	N/A	N/A	A *3)
	Clock		N/A	A	A	A	A	A	A
	SD		N/A	A	N/A	A	N/A	N/A	A
Ssytem menu (Test mode)	Touch switches		A	A	A	A	A	A	A
	Backlight		A	A	A	A	A	A	A
	Buzzer		A	A	A	A	A	A	A
	LCD		A	A	A	A	A	A	A
	Contrast		A	N/A	A	N/A	A	A	N/A
	DIPSW		A	A	A	A	A	A	A
	Brightness		A *5)	A *5)	A *5)	A *5)	A	N/A	N/A
	SD		N/A	A	N/A	A	N/A	N/A	A
	Sound		N/A	N/A	N/A	N/A	N/A	N/A	A *3)

*1) Only referring to PLC can be set.

*2) Summer time cannot be set.

*3) Available for GT32T1 only.

*4) Available for GT32M only.

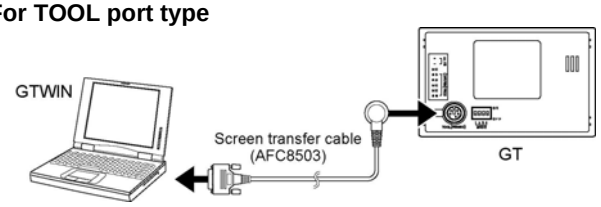
*5) Included in backlight test.

*6) As it can be used without any setting, setting on the GT Configuration screen is not required.

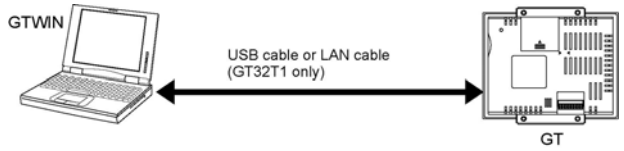
5.1.3 Flow of Entering Configuration Settings from Screen Creation Tool "GTWIN"

1. Set the GT configuration settings wih the GTWIN (GT configuration settings)
2. Connect the GT and the personal computer

For TOOL port type

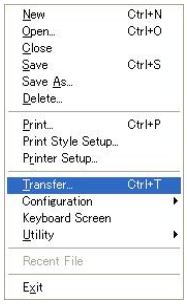


For USB port type/Ethernet port type



3. Transfer the GT Configuration file from GTWIN
After connections have been completed, use the following procedure to transfer the GT Configuration file from GTWIN.

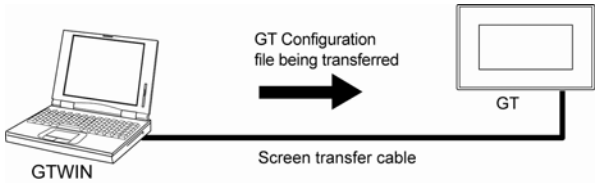
- Boot GTWIN, and select "Transfer" on the "File" menu.



- When the transfer function is selected, a dialog box for file transfer is displayed. At this point, specify the type of data to be transferred, and the direction of transfer.
  Transfer data: "GT Configuration"
  Transfer direction: "GTWIN → GT"
  Enter the above conditions and click on the "OK" button. The system files are transferred to the GT.

When the menu oepration as above is carried out, the GT configuration setting file sent to the GT. During the transfer, a screen like that shown below is displayed.
The firmware of the main unit of GT can be updated to the latest version by using the above-mentioned transfer function.

Reference: <5.4 GT version upgrade >



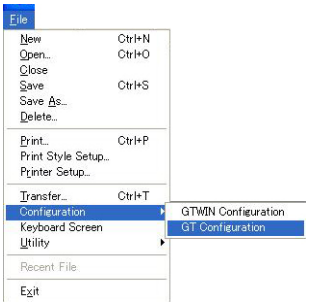
Note:
Backup of the GT Configuration file
The GT Configuration file is stored in the user memory (F-ROM) of the GT. This file is deleted if the memory is initialized using the command on the system menu of the GT, and will have to be transferred again.

5.2 Configuration Settings in “GTWIN”

This section describes how configuration settings for the GT are entered from the screen creation tool “GTWIN”.

Opening the GT Configuration Settings

To display the "Basic Setup" screen shown below, click with the mouse on [File] or select [Configuration] from the menu displayed with "Alt" + "F" keys and select [Configuration] from the submenu.



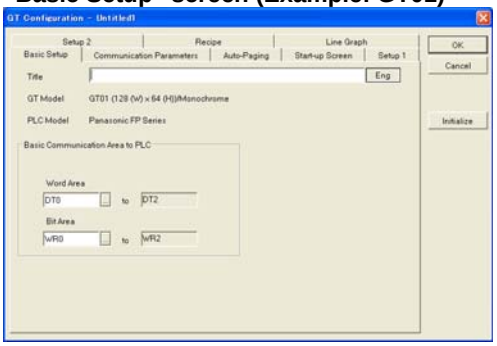
GTWIN Configuration: These are operating environment settings for GTWIN.

GT Configuration: These are configuration settings for the GT. The file is sent from GTWIN to the GT after the settings have been entered.

5.2.1 Basic Setup

This is used to specify the basic communication area used for communication between the GT and PLC, and the environment required for the GT operation.

“Basic Setup” screen (Example: GT01)



Displayed tags vary according to GT models.

- **Title:** The title of the configuration settings file is entered here. Titles are convenient if each GT has its own configuration settings.
- **PLC Model:** The model of PLC specified when GTWIN is booted is displayed here.
- **GT Model:** The model of GT specified when GTWIN is booted is displayed here.
- **Basic Communication area to PLC:** This is used to specify the mode in which communication takes place between the GT and PLC, and the internal PLC device used for basic communication.

Explanation of this function:

Standard settings

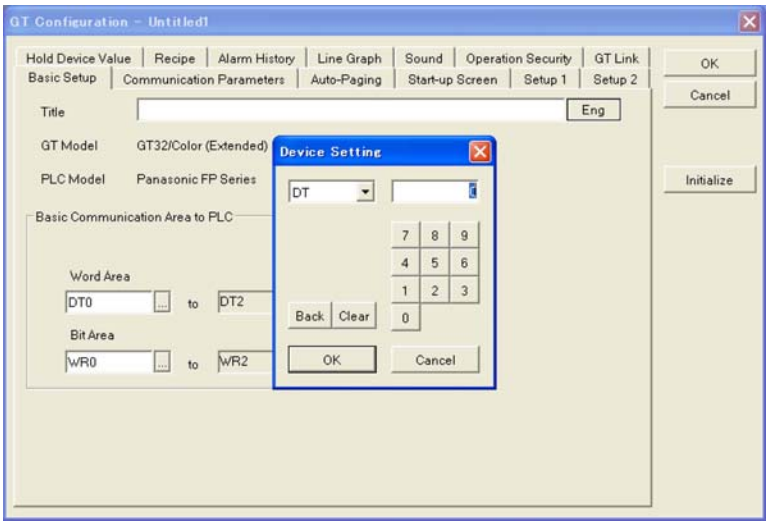
Clicking on the [Initialize] button in the “GT Configuration” dialog box displays the following message. Clicking on [OK] sets the default values (the configuration settings entered when the unit is shipped) for all of the settings.

Reference: <5.1.1 Factory Default of GT Configuration Settings >

5.2.2 Basic Communication Area with PLC

Specify the internal PLC device used for basic communication.
Select “Configuration” under “File” on the menu bar, and then select the sub-menu called “GTWIN Configuration”. This displays the dialog box for the GT Basic Setup, as shown below.

GT Configuration Basic Setup dialog box



Word area: This specifies the type of device that reads and writes screen numbers and other information in word units, and the initial address.

Bit area: This specifies the type of device that reads and writes backlight control and other bit information, and the initial address.

The type of device and addresses can be set by clicking on the [...] buttons for the various items.

Device settings dialog box

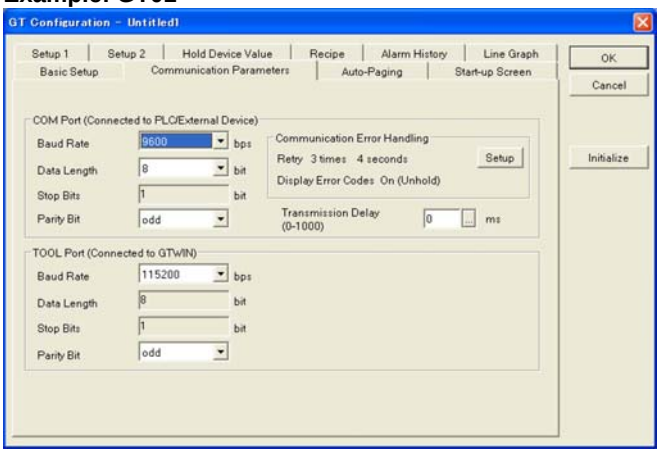
Clicking on the [▼] button displays a pull-down menu. Select the device for which settings are to be entered, and use the ten-keys to enter addresses.
The Back button functions as a backspace key when entering addresses.
The Clear button acts as a Clear key.

Reference: <5.5 GT01 Basic Communication Area Map>

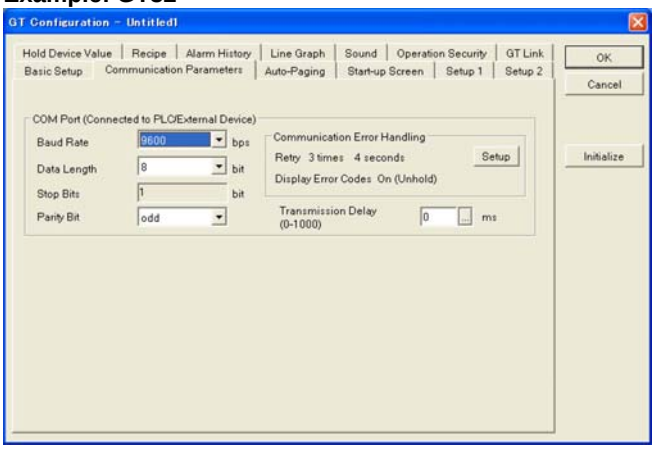
5.2.3 Communication Parameters

Clicking on the “Communication Parameeers” tab in the “GT Configuration” dialog box displays the following screen. This is where communication parameters for the PLC and personal compuer (GTWIN) connected to the GT are set.

“Communication Parameters” screen
Example: GT01



Example: GT32



COM port (Connected to PLC/External device)
This is used to specify the baud rate and transmission format when the GT is connected to an external device (PLC).

Clicking on the ▼ button displays a pull-down menu from which the value to be set can be selected.

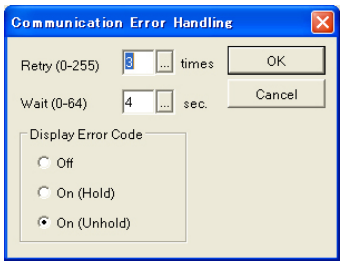
- **Baud rate:** Select 9600, 19200, 38400, 57600 or 115200.
- **Data length:** Select either “7 bits” or “8 bits”.
- **Stop bit:** This is fixed at “1 bit”.
- **Parity:** Select “None”, “Odd” or “Even”.

Reference: For using GT link, <Chapter 6 GT Link>

Handle communication error

Clicking on the Setup button displays the “Communication Error Remedy” dialog box. This is used to specify the processing to be used if a communication error occurs.

“Communication Error Remedy” dialog box



For “Retry” and “Waiting”, click the button and specify the values in the “Value Set” dialog box that is displayed.
For “Display Error Code”, select “Off”, “On (Hold)”, or “On (Unhold)” by clicking the radio button of the desired value to turn it on.

- **Retry:** This specifies the number of retries if a communication error occurs. The setting range is from 0 to 255 times.
- **Waiting:** This specifies the interval between retries if a communication error occurs. The setting range is from 0 to 255 seconds.

Display error code

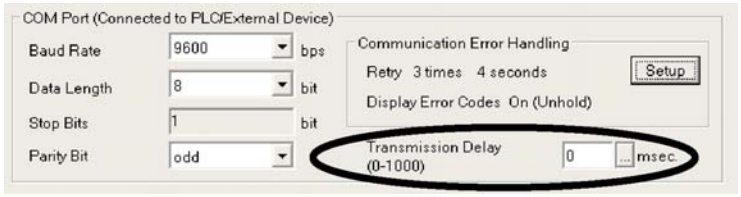
This switches the setting for the error code display used if a communication error occurs.

- **Off:** No error code is displayed if a communication error occurs.
- **On (Hold):** An error code is displayed at the upper right of the screen if a communication error occurs, and continues to be displayed until the power supply is turned off.
- **On (Unhold):** An error code is displayed at the upper right of the screen if a communication error occurs, and is cleared when the cause of the error is eliminated.

Reference: <Chapter 8 Troubleshooting>

Time until sending data

The time taken to send the next data from receiving data from an external equipment can be adjusted with the GT. The delay time longer than the preset value can be held by specifying the time until sending data. Set it when the external equipment cannot receive data properly as data transmission is too quick from the GT. The setting range is 0 to 1000 ms.



TOOL port (for GTWIN connection)
This is used to specify the baud rate and transmission format when the GT is connected to a personal computer (GTWIN).

Clicking on the button displays a pull-down menu from which the value to be set can be selected.

- **Baud rate:** Select 9600, 19200, 115200 or 230400.
- **Data length:** This is fixed at “8 bits”.
- **Stop bit:** This is fixed at “1 bit”.
- **Parity:** Select “None”, “Odd” or “Even”.

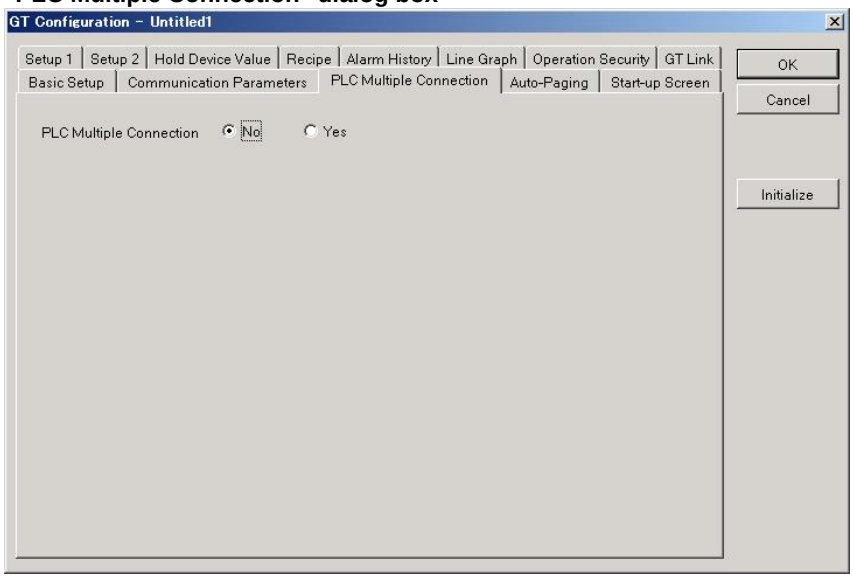
Note:
There is no TOOL port setting for USB port type/Ethernet type. Only communication with USB port or Ethernet port is available.

When the baud rate is set to 230400 bps:
- It can be used when the GT01, GT11 or GT21 is connected with the USB/RS232C conversion cable from the USB port of a computer.
- It cannot be connected by the automatic communication function in the GTWIN

5.2.4 PLC Multiple Connection

Clicking [PLC Multiple Connection] tab in [GT Configuration] dialog box shows the following screen.

"PLC Multiple Connection" dialog box



Use of PLC multiple connection

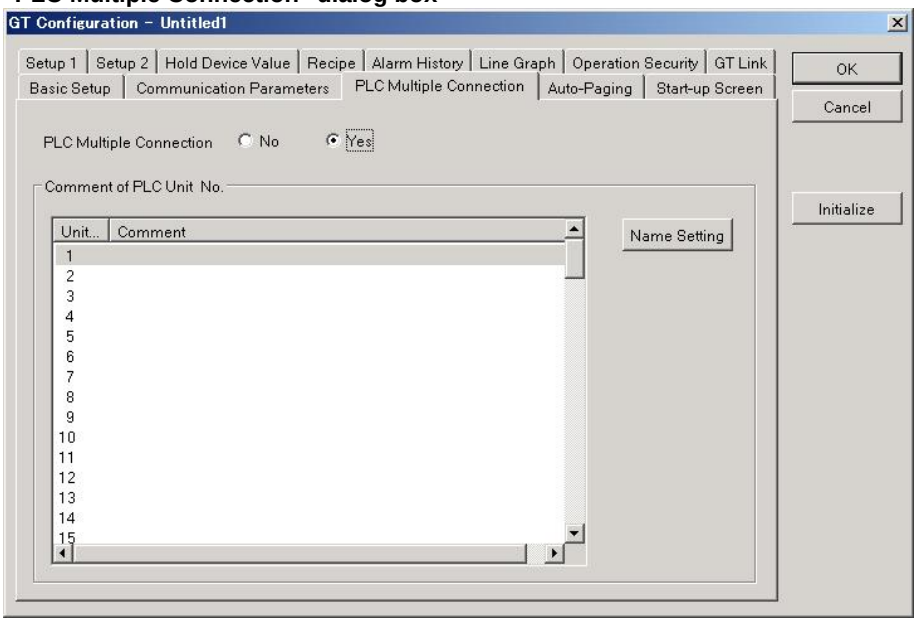
- **No** The PLC multiple connection is not used.
- **Yes** The PLC multiple connection is used.

When selecting "Yes" for the above "PLC Multiple Connection", the item for comment setting is shown.

Key Point: Only selecting "Yes" for the PLC multiple connection enables to register the comments on unit numbers which make the devices specified such as parts easier to recognize although the GT regcognizes the unit numbers specified on PLC.

Comment of PLC unit number

"PLC Multiple Connection" dialog box



Comments can be entered on unit numbers. It is recommended to register the comments on unit numbers which make unit numbers easier to recognize.

- **Comment of PLC unit No.:** Register comments on unit numbers.

Setting button This sets the comments on each unit number.
Click [Setting] button to open the following dialog box.

"Comment of PLC Unit Setting" dialog box

- **Unit No.:** The selected unit numbers are displayed. The numbers cannot be changed.
- **Comment:** Input comments on unit numbers. (64 characters)

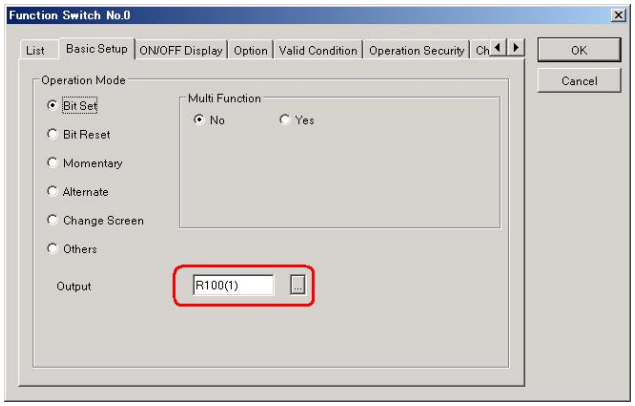
Clicking [OK] registers the setting. The screen returns to the original screen which the registered content is displayed.

Display of device when PLC multiple connection is made

Unit numbers should be specified at the same time that device values are set when registering devices on the screens such as the attribute editing screen.
The default is unit number 1.

When the device of R100 is set to the unit number 1:

TThe unit number is indicated after the device value.



When comments are not registered:

Unit number: 1

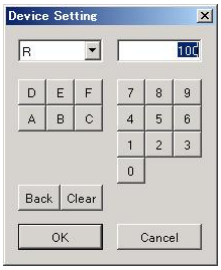
When comments are registered:

Unit number: 1 Comment: FP0

When comments on the PLC unit number have been registered, the unit number and comments are displayed after the device value.
When no comment has been registered, only the unit number is displayed.
Input directly or open the device setting dialog box, and set the unit number.

Device Setting screen

Default device setting screen



Device setting screen when "Yes" is selected for PLC multiple connection

Selecting a unit number on Device setting screen

Click the button in the first column and select a unit number. (1 to 99)
When comments have been input on the unit number in the "PLC multiple connection" setting of GT Configuration settings, the comment is also indicated.
Unit numbers and comments cannot be input on the device setting screen.

When directly inputting unit numbers after device values

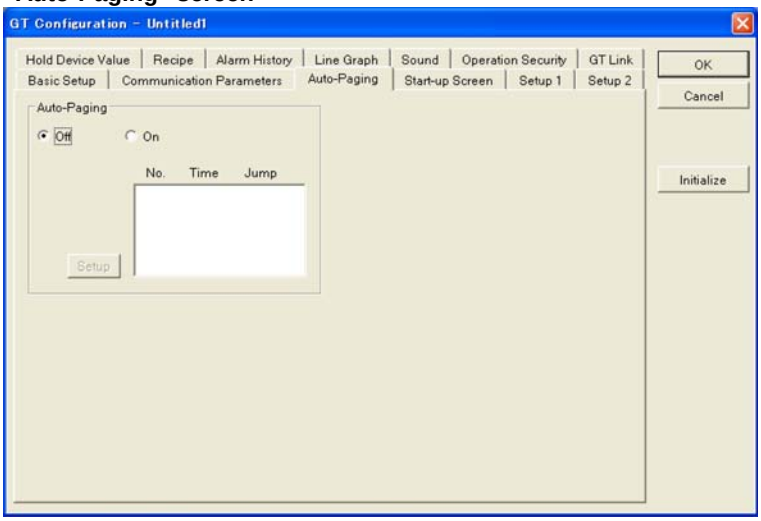
Change the value in parentheses to the unit number you want to set.

Key Point: Input only a unit number after the device value. As for the unit numbers that comments have been already input, the comments will be automatically displayed when GTWIN is restarted.

5.2.5 Auto-Paging

Clicking on “Auto-Paging” in the “GT Configuration” dialog box displays the screen shown below. Here, settings can be entered for a function that automatically switches the screens displayed on the GT.

“Auto-Paging” screen



Auto-paging

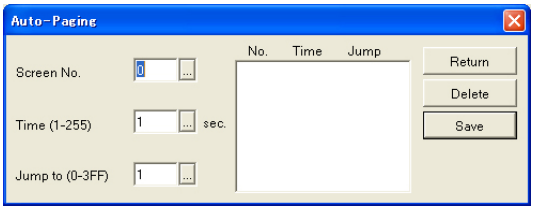
This is used to specify the “Auto-paging function”, which automatically switches the specified screen when a given period of time has elapsed.

- **Off:** The screen is not switched automatically.
- **On:** The screen is switched automatically, in conformance with the specified contents.

Auto-paging settings

If “On” is selected for auto-paging, and the [Setup] button is clicked, a dialog box containing the following auto-paging settings is displayed.

Clicking on the button for “Screen No.”, “Time”, or “Jump to” displays a “Value Set” dialog box. Set the value and click the [Save] button to save values one at a time.

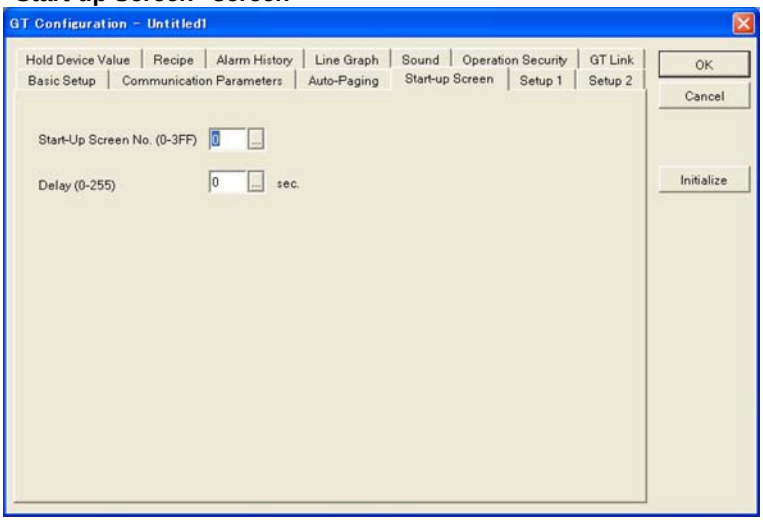


- **Screen No.:** This specifies the screen targeted for auto-paging.
- **Time:** This specifies the time for which the screen specified above is displayed. The setting range is from 1 to 255 seconds.
- **Jump to:** This specifies the number of the next screen to be displayed.
- **[Return]:** This completes the auto-paging settings and returns to the “Auto-Paging” dialog box.
- **[Delete]:** This deletes screens registered for auto-paging.
- **[Save]:** This saves the settings for the screen number, time, and jump destination as auto-paging settings.

5.2.6 Startup Screen Settings

Clicking on “Start-up Screen” in the “GT Configuration” dialog box displays the screen shown below. Here, the screen displayed when the GT is booted can be specified.

“Start-up Screen” screen



This is used to specify the screen that will be displayed when the GT is booted, as well as the time it will be displayed. Clicking on the button for each of the items displays a “Value Set” dialog box where the values can be specified.

- **Start-up Screen:** This specifies the number of the screen that will be displayed when the GT is booted. Clicking on the button displays a “Value Set” dialog box where the value for the start-up screen number can be specified.
- **Display time:** This specifies the time for which the startup screen specified above will be displayed. The value can be set to any number between 0 and 255 seconds. Clicking on the button displays a “Value Set” dialog box where the time can be specified.

Key Point:

- When the above settings are entered, the screen specified with the “Startup Screen” parameter is displayed for the amount of time specified with the “Display Time” parameter.
- When the amount of time specified with the “Display Time” parameter elapses, the screen corresponding to the number stored in the initial address of the word device under “Basic Communication Area to PLC” in the Basic Setup” parameters under “GT Configuration” will be displayed.
- This function is used when it is necessary to delay the start-up time when the power supply on the PLC side is turned on.

Note:

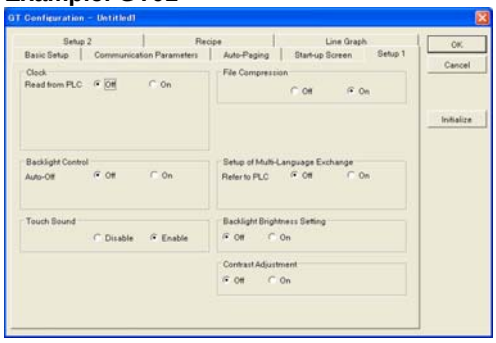
- Communication between the GT and the PLC (external device) cannot be carried out during the time specified by the “Display Time” parameter. Therefore, the switch part nor lamp part will not be displayed even if they are pasted on the start-up screen.

5.2.7 Setup 1

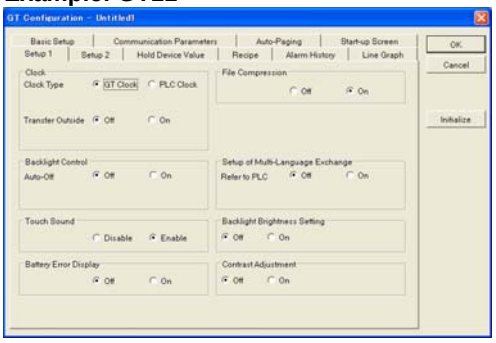
Clicking on the “Setup 1” tab in the “GT Configuration” dialog box displays the screen shown below. Here, clock functions, backlight control, and other parameters can be specified.

“Setup 1” screen

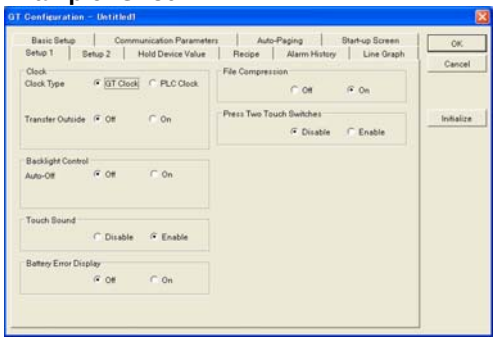
Example: GT01



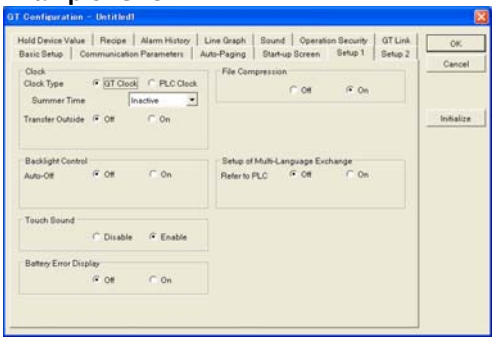
Example: GT11



Example: GT30



Example: GT32



A: Available N/A: Not available

“Setup 1” screen	GT01	GT05	GT11	GT12	GT21	GT30	GT32
Clock	A *1,2)	A	A *2)	A	A *2)	A *2)	A
Backlight control	A	A	A	A	A	A	A
Touch sound	A	A	A	A	A	A	A
Battery error display	N/A	A	A	A	A	A	A
File compression	A	A	A	A	A	A	A
Press two touch switches	N/A	N/A	N/A	N/A	N/A	A	N/A
Setup of multi language exchange	A	A	A	A	A	N/A	A
Backlight brightness setting	A	A	A	A	A	N/A	N/A
Contrast adjustment	A	N/A	A		A	N/A	N/A

*1) Only referring to PLC can be set.

*2) Summer time cannot be set.

Clock

This is used to specify the reference destination for the clock displayed with the GT. Select one of the radio buttons.

GT Clock	When the time is displayed, the internal clock in the GT is used as a reference for the value.
PLC Clock	When the time is displayed, the internal clock in the PLC is used as a reference for the value.

If the “PLC Clock” is referenced for the clock setting, clicking on the button displays a screen where the type of device and the address can be specified.

Device Setting dialog box

Click on the button to display the pull-down menu, and select the device from that menu. Enter the address using the ten-keys.

The Back button functions as a backspace key when entering addresses.
The Clear button acts as a Clear key.

The following table shows the clock data referred.

Reference sequence of clock data

Address	Upper byte	Lower byte
Top address	Minutes data (H00 to H59)	Second data (H00 to H59)
Top address + 1	Day data (H01 to H31)	Hour data (H00 to H23)
Top address + 2	Year data (H00 to H99)	Month data (H01 to H12)
Top address + 3	-	Day data (H00 to H06)

Note) In the day data, H00 indicates Sunday and H06 indicates Saturday.

Summer time

This is used to set the standard summer time (daylight saving time) in USA or Europe.

Not use	Summer time (daylight saving time) is not used.
Use (USA)	Summer time (daylight saving time) in USA is used. (From 2:00 AM on the 2nd Sunday of Mar. to 2:00 AM on the 1st Sunday of Nov.)
Use (Europe)	Summer time (daylight saving time) in Europe is used. (From 1:00 AM on the last Sunday of Mar. to 1:00 AM on the last Sunday of Oct.)

Transfer Outside

Clock data displayed in the GT can be transferred to an external device such as a PLC, using this setting.

Off	The GT clock data is not transferred to an external device.
On	The GT clock data is transferred to an external device.

If “On” is selected for the above “Transfer Outside” parameter, click on the button to specify the output destination and the initial device, and specify the address.

Transfer sequence of clock data

Address	Upper byte	Lower byte
Top address	Minutes data (H00 to H59)	Second data (H00 to H59)
Top address + 1	Day data (H01 to H31)	Hour data (H00 to H23)
Top address + 2	Year data (H00 to H99)	Month data (H01 to H12)
Top address + 3	-	Day data (H00 to H06)

Note) In the day data, H00 indicates Sunday and H06 indicates Saturday.

Note:

If “On” is selected for the “Transfer Outside” parameter, the data will be transferred to the DT90054 as the default device. If this device address does not exist in the PLC connected to the GT, onfirm, re-specify the address so that it matches the model connected to the GT.
Selecting a device address that does not exist in the PLC will cause an error ER61 (or ER0061) to occur.

Backlight control

Auto-Off

This is used to specify the Auto-Off backlight feature.

Off	The Auto-Off backlight feature is not used.
On	Auto-Off backlight feature is used. This parameter specifies the period of time that the GT is inactive before the backlight goes off automatically.

If “On” is set for the above Auto-Off backlight feature, clicking on the button displays a screen where the time until the backlight goes off can be specified. Any time from one minute to 30 minutes can be specified.

Key Point:

If the backlight is turned off automatically using the backlight control function, touching the screen turns it on again. If a touch switch happens to be located at that point on the screen, it will be invalid until the backlight has gone on again.

Touch Sounds

This sets the touch sounds corresponding to GT screens as either invalid or valid. Select one of the radio buttons.

Disable	Touch sounds are disabled.
Enable	Touch sounds are enabled.

Battery Error Display

This specifies whether or not a dead battery mark will be displayed on the GT screen if the voltage of the internal battery drops too low or the battery is dead.

Off	The dead battery mark ( ) is not displayed.
On	The dead battery mark ( ) is displayed.

* The BAT and BAT LOW flags in the basic communication area map activate in the both cases that the battery error display is set to “On” and “Off”.

For GT30

This specifies whether or not a battery change mark will be displayed if the voltage of the internal battery drops too low, and whether or not a dead battery mark will be displayed if the battery is dead on the Gtscreen. Select one of the radio buttons.

Off	The onfirm change mark ( ) or the dead battery mark ( ) is not displayed.
On	The onfirm change mark ( ) or the dead battery mark ( ) is displayed.

The BAT and BAT LOW flags in the basic communication area map activate in the both cases that the battery error display is set to “On” and “Off”.

File Compression

This is used to compress the screen data to transfer to the GT. More screens can be registered using the File Compression. (The switching rate of some screens may get slower. Verify the switching rate trying actually.)

Off	Screen data is not compressed.
On	Screen data is compressed.

Press Two Touch Switches

Disable	Two points cannot pressed.
Enable	Two points can be pressed.

Setup of Multi language exchange

This is used if you want to change the language to be displayed from the PLC side.

Off	PLC is not referred.
On	The specified PLC is referred.

Backlight brightness setting

This is used to specify whether to transfer data to the GT with or without the backlight brightness adjustment. Select either one of the radio buttons. When setting it to “on”, the setting value (0 to 14) can be specified.

Off	The backlight brightness is not adjusted.
On	Transfer data after the backlight brightness has been adjusted.

Contrast adjustment

This is used to specify whether to transfer data to the GT with or without the contrast adjustment. Select either one of the radio buttons. When setting it to “on”, the setting value (0 to 14) can be specified.

Off	The contrast is not adjusted.
On	Transfer data after the contrast has been adjusted.

Reference:

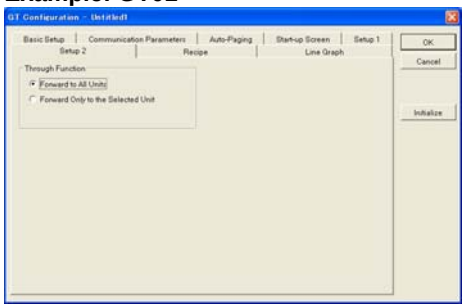
For details on Multi language exchange function, <GTWIN Manual ACGM0357V**EN>, <GTWIN HELP>

5.2.8 Setup 2

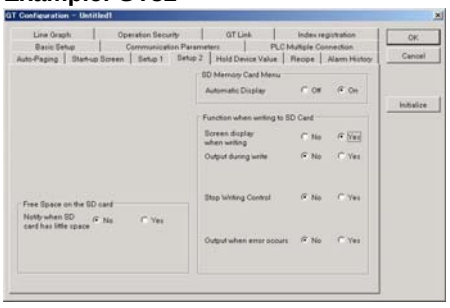
Clicking on the “Setup 2” tab in the “GT Configuration” dialog box displays the screen shown below.

“Setup 2” screen

Example: GT01



Example: GT32



A: Available N/A: Not available

“Setup 2” screen	GT01	GT05	GT11	GT12	GT21	GT30	GT32
Through function	A	A Note)	A	A Note)	A	A	A Note)
SD memory card menu	N/A	A	N/A	A	N/A	N/A	A

Note) The through function can be used, and the setting on the GTWIN is not required.

Through function

If the “Forward only to the selected unit” check box is turned on, communication can be carried out via the through function only with unit numbers for a PLC received from a higher-order personal computer or higher-order PLC.

SD memory card menu

This is used to set to display the SD memory card menu automatically when a SD memory card was inserted.

Off	The menu is not displayed automatically.
On	The menu is display automatically.

Write to SD card/SD card free space

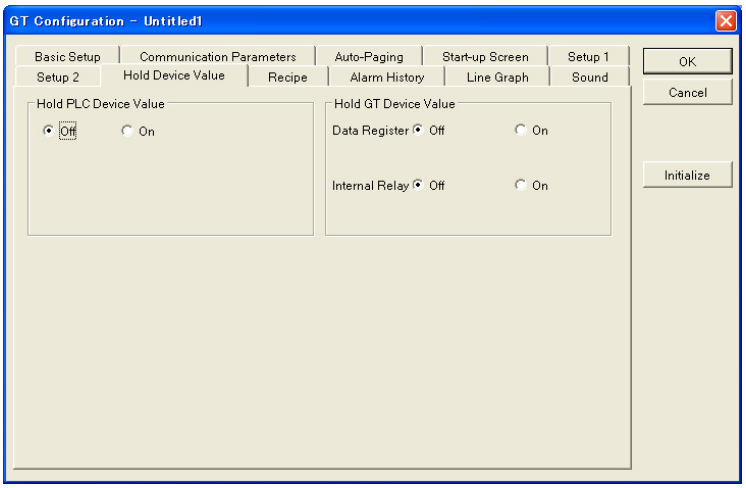
It is set when using the logging function.

Reference: GTWIN Operational Guide Book ARCT1F375E <Chapter 8 Logging Function>

5.2.9 Hold Device Value

Clicking on the “Hold PLC Device” tab in the “GT Configuration” dialog box displays the screen shown below. “Hold PLC Device” is a function that enables internal PLC device values to be held on the GT side. “Hold GT Device” is a function that holds the values for an internal device (GDT or GWR) in the GT.

“Hold Device value” screen



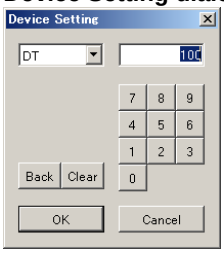
Hold PLC Device

The Hold PLC Device function reads the values for the specified internal PLC device to the SRAM in the GT, and tacks up the values.

Off	PLC devices are not held.
On	PLC devices are held. (up to 24 words)

If “On” is selected for the above Hold PLC Device setting, “Device” and “Number of Word” parameters are displayed. Clicking on the button displays a dialog box like that shown below, where the type of initial device, the address, and the number of words can be specified.

Device Setting dialog box



Click on the button to display the pull-down menu, and select the device from that menu. Enter the address using the ten-keys.

The Back button functions as a backspace key when entering addresses. The Clear button acts as a Clear key.

Note:

- Data for PLC devices held in the GT will be written to the internal PLC device the next time that the power supply is turned on.
- The data held for the internal PLC device is backed up by means of a lithium battery. The service life of the battery is approximately two years.

Reference: <3.5 Servicing and Maintenance>

Hold GT Device

"Hold GT Device" is a function that backs up the values for an internal device (GWR or GDT) in the GT.

Data register

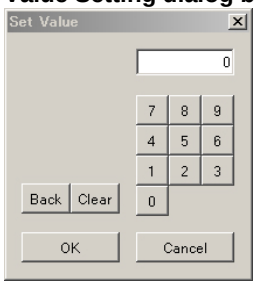
Don't hold	The GT internal device hold function is turned off.
Hold	The GT internal device hold function is turned on.

Internal relay

Don't hold	The GT internal device hold function is turned off.
Hold	The GT internal device hold function is turned on.

If the above setting for the Hold GT device function is set to "On", a "Start No." item is displayed. Click on the button to display the value setting dialog box shown below, and specify a starting number. After the setting has been entered, the contents of any addresses subsequent to the specified value will be held.

Value Setting dialog box



Enter the starting number, using the ten-key pad.

The Back button functions as a backspace key when entering addresses. The Clear button acts as a Clear key.

Note:

GT internal device

Device type		Address range	Points
Memory	Data register	GDT0000 to GDT2047	2048 words
	Internal relay	WGR0000 to WGR0255	256 words
Bits	Internal relay	GR0000 to GR255F	4096 points

Note) The WGR and GR are the same memory, but in the WGR, bits are handled in word units.

- The data held for the internal PLC device is backed up by means of a lithium battery.
  The service life of the battery differs depending on the models.

Reference: <3.5 Servicing and Maintenance>

5.2.10 Other Settings

As for Recipe function, alarm history, line graph, sound, operation security function

Reference: <GTWIN Manual ACGM0357V**EN>

As for GT link

Reference: <Chapter 6 GT Link>

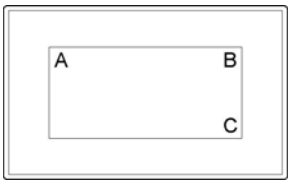
5.3 Entering Configuration Settings from GT

What is the System Menu?
The system menu is a dedicated screen for specifying the configuration settings of the GT with the touch panel.
Some of the items that can be specified here can also be set using GTWIN screen creation tool and then sent to the GT, but others, such as the adjustments to the LCD contrast level, can only be set using the system menu. This section explains how configuration settings are entered using the system menu.

5.3.1 Bringing Up the System Menu

The following procedure is used to bring up the system menu

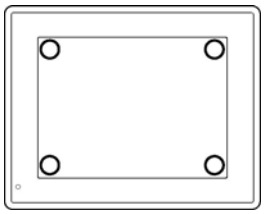
1. Touch the LCD touch panel as the following procedure.



1. Press the area A (upper left corner) for at least two seconds.
2. Touch the area B (upper right corner) for a quick moment in 2 seconds after lifting the finger from the area A, and then touch the area C (lower right corner) in 2 seconds.
3. The system menu is displayed after blip sounds.

* For vertical type displays, arrange the GT vertically and, press the top left corner, top right corner and bottom right corner in order.
* The System Menu does not support vertical type displays. It will display the same as on the horizontal type.

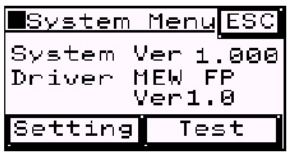
For GT30



1. Touch four corners at the same time, and continue pressing them for about one second.

2. The initial screen of the system menu is displayed.

The screen of the system menu varies depending on the GT models.
The following is explained using the GT01 screen.



"System Ver" indicates the ROM version of the GT system.

The initial screen of the system menu is displayed on the GT. Touching either the [Setting] or [Test] key shifts to the next screen.
Touching the [ESC] key exists the system menu and returns to the normal operating mode.

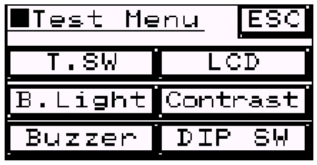
Note) There is no screens for selecting the setting mode and test mode in the initial screens of the GT21 and GT30.

3. Select the mode.

[Setting] Setting mode initial screen

This is where configuration settings for the GT, such as the contrast, clock, and memory, are specified.
Please refer to the table below for the information on the available settings for each model.

[Test] Test mode initial screen



This is where GT configuration elements such as the touch switches, backlight, clock, buzzer, LCD, contrast, and memory are tested.

Available functions for each model

A: Available N/A: Not Available

Function name	GT01	GT05	GT11	GT12	GT21	GT30	GT32
Contract adjustment	A	A	A	A	A	A	A *4)
Brightness adjustment	A	A	A	A	A	N/A	N/A
Touch switch adjustment	A	A	A	A	A	N/A	A
SRAM clear	A	A	A	A	A	A	A
FROM clear	A	A	A	A	A	A	A
Copy function	A	N/A	A	N/A	A	N/A	N/A
COM port setting	A	A	A	A	A	A	A
TOOL port setting	A	N/A	A	N/A	A	A	N/A
Ethernet port setting	N/A	N/A	N/A	N/A	N/A	N/A	A *3)
Clock	N/A	A	A	A	A	A	A
SD	N/A	A	N/A	A	N/A	N/A	A

*3) Available for GT32T1 only.

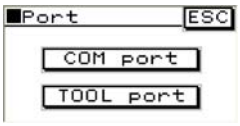
*4) Available for GT32M only.

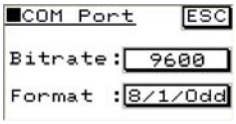
5.3.2 Setting Mode “Communication Parameters”

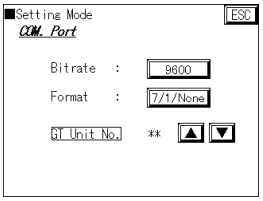
Touching the [Setting] Key on the initial screen of the system menu and then touching the [Port] key on the setting mode menu displays the port selection screen. Then, selecting the [COM Port], [TOOL Port] or [Ethernet Port] displays the communication parameter setting screen for each prot. Here, parameters controlling communication between the PLC and personal computer (GTWIN) connected to the GT are specified.

COM port communication parameter settings (PLC communication parameter settings)

Procedure for bringing up the screen
[Initial screen]
↓
[Setting]
↓
[Port]
↓
[COM Port]







Bitrate: PLC baud rate

This sets the baud rate for communication with an external device (PLC) connected to the GT.
Each time the [Function] key is pressed, the baud rate switches in the sequence of 9600, 19200, 57600, 115200. Set the baud rate to match that of the PLC connected to the GT.

Format: Transmission format

This sets the communication parameters (data length, stop bits, parity) for the external device (PLC) connected to the GT.
The items displayed are: Data length/Stop bit/Parity, and each time the [Function] key is pressed, the display switches in the sequence of: [7/1None], [7/1/Odd], [7/1/Even], [8/1/None], [8/1/Odd], [8/1/Even]. Set the parameters to match those of the PLC connected to the GT.

GT Unit No.: Unit number setting

When the connected external device is the general-purpose serial, Modbus (RTU mode) slave, the unit number for the GT can be set.

Touch panel operation:

[Return] To complete the settings and return to the previous screen, touch the [ESC] key.

Explanation of this function:

The default values for the COM port communication parameter settings are: 9600, 8/1/Odd.

TOOL port communication parameter settings (GTWIN communication parameter settings)

Procedure for bringing up the screen

[Initial screen]

↓

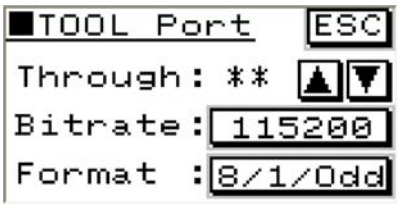
[Setting]

↓

[Port]

↓

[TOOL Port]



Through function: Through function destination setting (part)**

When the through function is being used, this specifies the number of the PLC of the connection. Normally, when used in a 1:1 configuration, this should be set to “0”.

Note:

In case of the GT32, it is displayed on the port selection screen.

Bitrate: PLC baud rate

Each time the [Function] key is touched, the baud rate switches in the sequence of 9600, 19200, 115200 and 230400*. Set the baud rate to match that of the personal computer (GTWIN) connected to the GT.

The baud rate of 230400 is available when connecting with the USB/RS232C conversion cable.

Format: Transmission format

This sets the communication parameters (data length, stop bits, parity) for the personal computer (GTWIN) connected to the GT.

The items displayed are: Data length/Stop bit/Parity, and each time the [Function] key is pressed, the display switches in the sequence of: [8/1None], [8/1/Odd], [8/1/Even].

Touch panel operation:

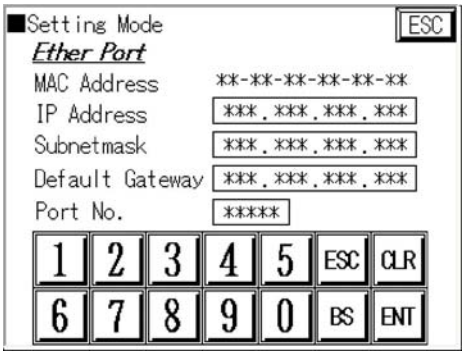
[RETURN] To complete the settings and return to the previous screen, touch the [ESC] key.

Explanation of this function:

The default values for the TOOL port communication parameter settings are: 115200, 8/1/Odd.

Ethernet port communication parameter settings (GTWIN communication parameter settings)
Touching [Ethernet Port] key displays the Ethernet Port setting screen.

[Ethernet Port]



* The screen of GT32 is used.

The IP address or port No. is specified for Ethernet communication.
Touching the area of the setting value of the item to change displays the keyboard. Then set the value.

The default values are as below.

IP Address	**192.168.1.5**
Subnetmask	**255.255.255.**
Default Gateway	**192.168.1.1**
Port No.	**9094**

Note:
There are values that cannot be input for each setting of Ethernet. When such a value was entered, the error code is displayed.

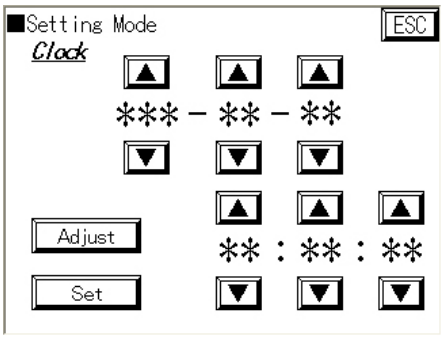
Reference: <6.4 Error Codes and How to Handle Them>

Touch panel operation:
[Return] To complete the settings and return to the previous screen, touch the [ESC] key.

5.3.3 Setting Mode “Clock Settings” (Clock)

Touching the [Clock] key in the setting menu on the initial screen of the system menu displays the clock setting screen. The internal clock of the GT is set here.

Clock setting screen
Procedure for bringing up the screen
[Initial screen]
↓
[Clock]



* The screen of GT32 is used.

The time displayed on the screen is the current time indicated by the internal clock of the GT. Items can be changed by touching the item (year, month, day, hour, minute, second) and touching the [+] and [-] keys to change the values.

Touch panel operation:
[ADJUST] Touching the [+] key increases the contrast, and touching the [-] key decreases it.

[SET] Touching the [SET] key updates the Value Set and restarts the clock. Touching the [ADJUST] key sets the seconds value of the current time to “00”. A seconds value of 0 to 29 is rounded off to the next lower value, and a seconds value of 30 to 59 is rounded off to the next upper value.
Example:
If the time is set to 12 (hours) : 35 (minute) : 29 (seconds)
→ 12 (hour) : 35 (minute) : 00 (seconds)
If the time is set to 12 (hours) : 35 (minutes) : 30 (seconds)
→12 (hour) : 36 (minute) : 00 (seconds)

[RETURN] To complete the settings and return to the previous screen, touch the [ESC] key.

Explanation of this function:
Setting the day
The day is set automatically, based on the year, month, and date data.

5.3.4 Setting Mode “Contrast Adjustment and Brightness Setting” (Contrast/Brightness)

Touching [Setting] on the initial screen of the system menu and then the [Display] ([Contrast & Brightness] for GT05, [Contract] for GT32) key of the setting mode menu displays the contrast adjustment and brightness setting screen.

Contrast adjustment and brighteness setting screen

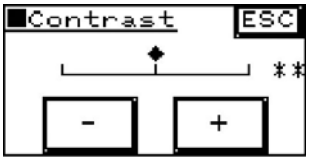
Procedure for bringing up the screen
[Initial screen]
↓
[Setting]
↓
[Display]

Contrast adjustment (Contrast)

Touching [Contrast] on the contrast adjustment and rightness setting screen displays the contrast adjustment screen. The contrast of the GT is adjusted here.

Contrast adjustment screen

Procedure for bringing up the screen
[Contrast adjustment and brightness setting screen]
↓
[Display]
↓
[Contrast]



Touch panel operation:

[ADJUST] The value can be set in the range of 0 to 14.
Touching the [+] key increases the contrast, and touching the [-] key decreases it. The values and the ♦ mark are the value set. The standard value is 7 and when the ♦ mark is located at the center.

[RETURN] To complete the settings and return to the previous screen, touch the [ESC] key.

Brightness setting screen

Procedure for bringing up the screen
[Contrast adjustment and brightness setting screen]
↓
[Display]
↓
[Brightness]

Touch panel operation:

[ADJUST] The value can be set in the range of 0 to 14.
Touching the [+] key increases the brightness, and touching the [-] key decreases it. The values and the ♦ mark are the value set. The standard value is 7 and when the ♦ mark is located at the center.

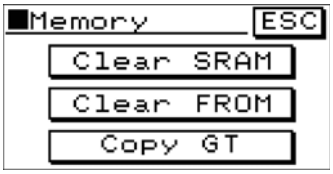
[RETURN] To complete the settings and return to the previous screen, touch the [ESC] key.

5.3.5 Setting Mode “Memory Initialization” (Clear Memory)

Touching [Setting] on the initial screen of the system menu and then the [Memory] key of the setting mode menu displays the memory initialization screen. The internal user memory of the GT is initialized here.

Memory initialization and copy GT function setting screen

Procedure for bringing up the screen
[Initial screen]
↓
[Setting]
↓
[Memory]



[SRAM] Touching the [SRAM] key initializes the line graphs, PLC device hold data, alarm history and GT internal device data stored in the SRAM.
Note) The GT01 does not have alarm history data.
The GT30 does not have PLC device hold, alarm history, and GT internal device data.

[FROM] Touching the [FROM] key deletes screen data and main unit configuration settings saved to the main unit user memory (F-ROM).

When either of the above keys is touched, a confirmation message reading [Clear OK?] is displayed. To clear the data, touch the [Clear OK?] key. A buzzer sounds, and the memory starts to be cleared, and the display changes to [Now Working]. When [Cleared] is displayed, the memory has been completely cleared. Do not turn off the power supply during [Now Working]. If the power supply is turned off, please perform to clear memory again.

Touch panel operation:

[RETURN] To complete the settings and return to the previous screen, touch the [ESC] key.

Note:

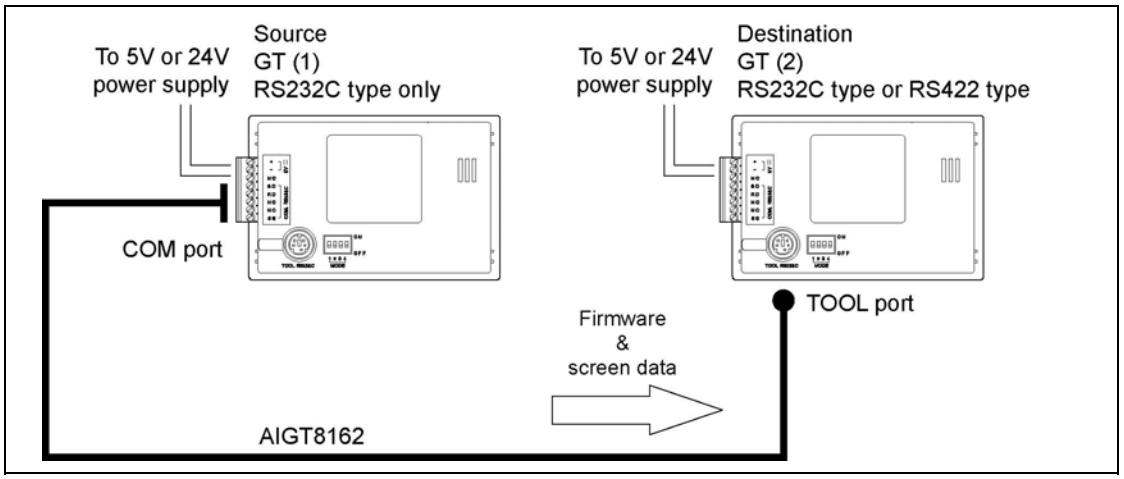
- [SRAM] initialization deletes the line graph data stored in the SRAM. Also the line graph data is not backed up, and it will be deleted when the power supply is turned off.
- [FROM] initialization deletes the base screen data, the GT configuration setting data (the GT configuration setting data returns to the default values) and contrast adjustment setting data (the contrast returns to the default value) in the user memory (F-ROM) of the main unit.

  Before initializing the F-ROM, always save screen data in a PC or another medium with GTWIN.

5.3.6 Setting Mode “Memory Initialization” (COPY GT)

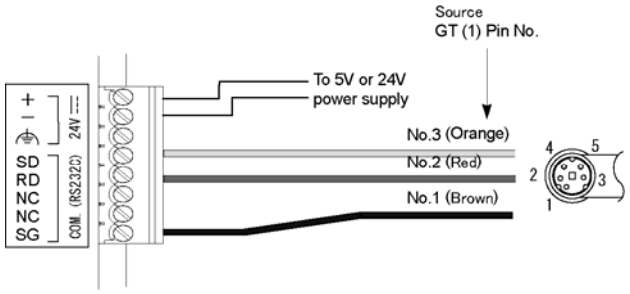
This function is used to transfer screen data connecting the GT units. Connect a cable between the COM port of the source GT that sends data and the TOOL port of the destination GT that receives the data. Operate the source GT.

Use the RS232C type as the source GT unit. (The RS422 type cannot be used as the source GT unit.)



PLC communication cable: Mini-DIN 5-pin loose-wire cable (AIGT8162)

Connecting COM port of source GT (1) with TOOL port of destination GT (2) (AIGT8162)



Source GT (1) side / To 5V or 24V power supply / Destination GT (2) side

Pin No.	Signal name
1	+
2	–
3	FG
4	SD
5	RD
6	NC
7	NC
8	SG

Pin No.	Signal name
1	SG
2	SD
3	RD
4	NC
5	(+5V)

* Although no. 6 and 7 of GT11/GT21 is RS/CS, they are used in the above connections.

Note:

- **The copy GT function is only available for the same models.**
- **If the connection is incorrect, the screen data of the source GT is deleted.**

How to send screen data

Touching [Setting] on the initial screen of the system menu of the source GT and then the [Memory] key of the setting mode menu displays the selection screen for the memory initialization and copy GT function.

Selection screen for memory initialization and copy GT function

Procedure for bringing up the screen

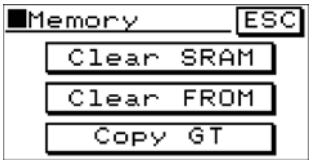
[Initial screen]

↓

[Setting]

↓

[Memory]



Touching [Copy GT] key changes the screen to the copy GT function screen.

Copy GT function screen

[Copy GT]

When [Start] key is touched, a message reading [Start OK?] is displayed. To copy the data, touch the [Start OK?] key. The following messages are displayed according to the operation states.

Message	Operations state	Measures
Initializing	The data of the destination GT is being initialized.	-
Transferring	Image data is being transferred.	
Finished	Transmission has completed successfully.	
Protected	A password has been set for the destination GT.	Cancel the password of the destination GT.
Cannot copy	The firmware of the source GT does not support the destination GT.	Check the version of the firmware of the destination GT.
Error	Communication error	Check the communication settings of the both GTs.

Touch panel operation:

[RETURN] To return to the memory initialization and copy GT function selection screen, touch the [ESC] key.

To return to the copy GT function screen, touch the [Finished] key.

Explanation:

Order of transfer between the GTs

Transferring data between the GTs is carried out in the following order.

1. Initialize the screen data of the GT (2) (if the screen data exists in the GT (2)).
2. Transfer the firmware of the GT (1) (if the version is different from the GT (2)).
3. Transfer the screen data.
4. The transfer completes.

*When the screen data does not exist in the GT (1), the firmware is transferred. If the verion is the same, finish the onfirmat without transferring the firmware.

Note:

- **Do not turn off the power supply of the main unit during data transfer.**
  Also, do not pull out the cable between the GT (1) and GT (2). The units may not be restarted.
- When a password is set for the destination GT, data transfer is not available.
- When a password is set for the source GT, the password setting is also transferred.
- The baud rate for the source GT and the destination GT must be the same. Otherwise the communication is not possible.
- If the screen data does not exist in the source GT, only the firmware is transferred. Even if the version of the firmware of the destination GT is a newer version, it is changed to the version of the source GT.

5.3.7 Setting Mode: “Touch Switch Adjustment” (Touch SW)

Touching [Setting] on the initial screen of the system menu and then the [Touch SW] ([T. SW] for the Gt01) key of the setting mode menu displays the touch switch adjustment screen. The position of the GT touch switch is adjusted here.

Touch switch adjustment screen

Procedure for bringing up the screen

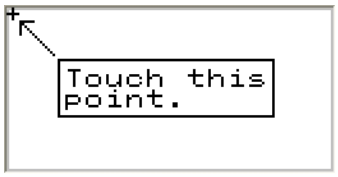
[Initial screen]

↓

[Setting]

↓

[Touch SW]



Touch panel operation:

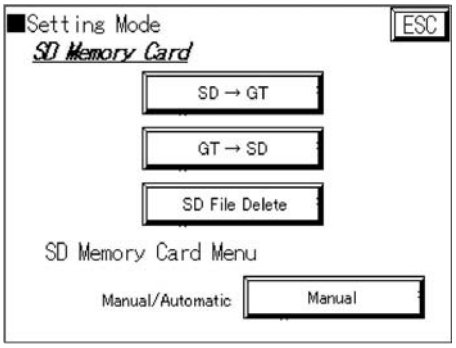
[ADJUST] Touch the “+” mark with a soft, narrow instrument. Touch the “+” mark three times as displayed on the screen. Please repeat if the touch position has shifted greatly. You will not lose this setting when the power is turned off. The setting will be initialized when the F-ROM memory is initialized.

[RETURN] The adjustment should be completed to return to the previous screen.

5.3.8 Setting Mode “SD Memory Card”

Touching [SD Memory Card] key of the system menu displays the setting screen. Various setting screens can be displayed by touching each key on the screen.

SD memory card setting screen
Procedure for bringing up the screen
[Initial screen]
↓
[Setting Menu]
↓
[SD Memory Card]



[SD→GT] Screen data is copied to the GT from a SD memory card.
Note) If the firmware version of the screen data saved in the SD memory card is different from the version of the GT, it is changed to the version at the time the screen data was created.
[GT→SD] The screen data of the GT is copied to the SD memory card.
[SD File Delete] The file of the screen data saved in the SD memory card is deleted.

SD Memory Card Menu
[Manual/Automatic] The screen when a SD memory car is inserted in the SD memory card slot is set.

Note:
A maximum of 16 data can be stored.

Cautions on handling a SD memory card
It is recommended to save data in another media for backup.
Do not remove the card and turn off the power supply of the unit when the SD memory card access lamp lights up (data is being read/written into the card). Data may be damaged.
Data cannot be copied to a SD memory card from the GT when the password protection has been set. Disable the password protection with GTWIN.

The data saved in the SD memory card may be lost in the following cases. We assume no responsibility whatsoever for the lost of saved data.

- When a user or third party used the SD memory card incorrectly.
- When the SD memory card was affected by any static electricity or electrical noise.
- When the SD memory card was removed or the power supply of other equipment was turned off while the unit was accessing the SD memory card such as saving or deleting data.

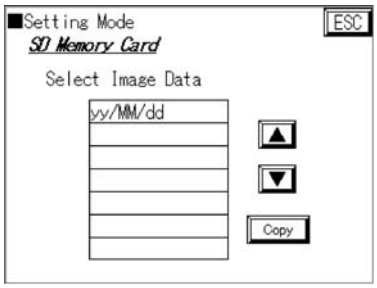
Reference: For the details of SD memory card, GTWIN Manual

SD → GT

Touching [SD→GT] key displays the screen data selection screen in the SD memory card. Select a file with ▲▼ keys.

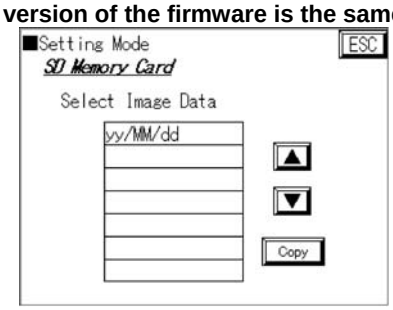
Screen data selection screen

[SD → GT]



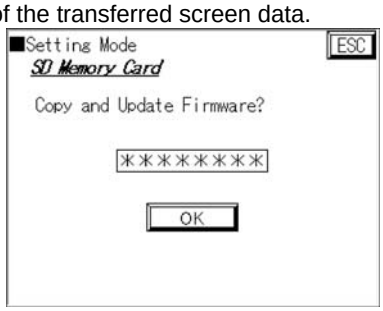
Touching [Copy] key displays the confirmation screen.

Transfer confirmation screen (when the version of the firmware is the same)



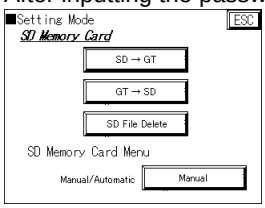
Transfer confirmation screen (when the version of the firmware is different)

Note) It is changed to the firmware version of the transferred screen data.

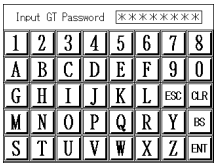


Data transfer to password-protected GT from SD memory card

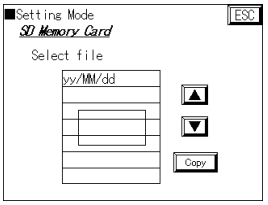
When the GT is protected with a password, pressing "SD → GT" shows the screen to input the password. After inputting the password, the file list in the SD memory card is displayed.



⇒ Password entry is required.



⇒



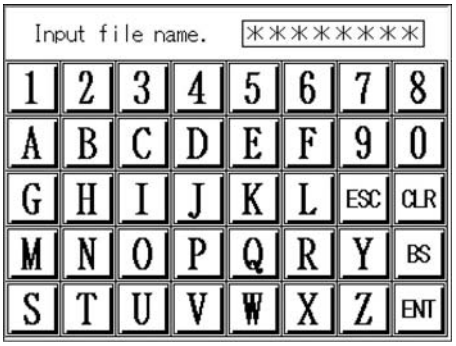
Touch panel operation:

[SELECT] To select a file, touch the file name. To move upward, touch ▲ key. To move downward, touch ▼ key.

[RETURN] To complete the settings and return to the previous screen, touch the [ESC] key.

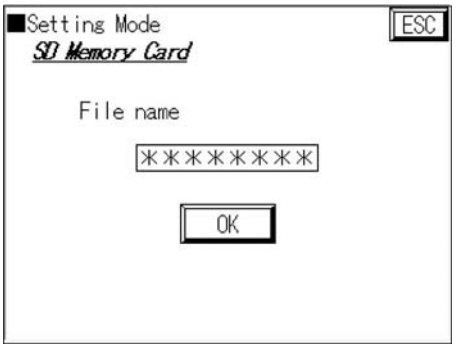
GT → SD
Touching [GT→SD] key displays the [Input file name" screen to save the screen data of the GT to the SD memory card. Input a file name and touch [ENT] key. * Up to 8 alphanumeric letters can be input.

File name input screen
[GT → SD]



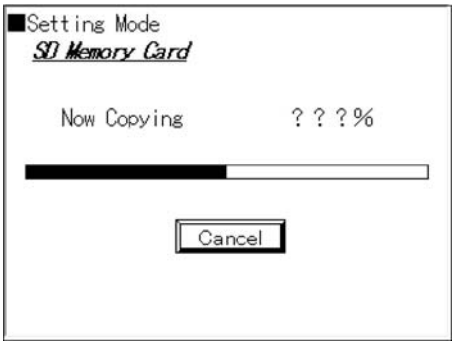
As [File name confirmation screen] is displayed. After you confirmed, touch [OK] key. (If there is any change, touch [File name] to display [File name onfirmation screen].)

File name confirmation screen



[SD memory card write screen] is displayed.

SD memory card write screen



If the same file name has been already saved, [Overwrite confirmation screen] is displayed. Touching [OK] key after saving returns to the SD card menu sreen.

Overwrite confirmation screen

Touch panel operation:

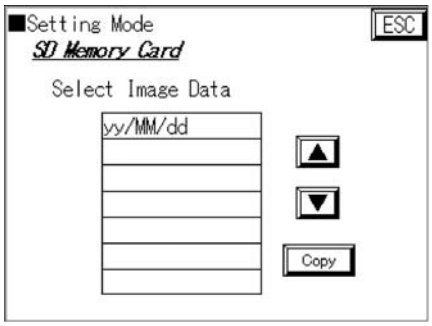
[RETURN] To complete the settings and return to the previous screen, touch the [ESC] key.

SD File Delete

The GT32 screen data saved in the SD memory card can be deleted.
Touching [SD File Delete] key displays the screen data selection screen in the SD memory card. Select a file with ▲▼ keys.

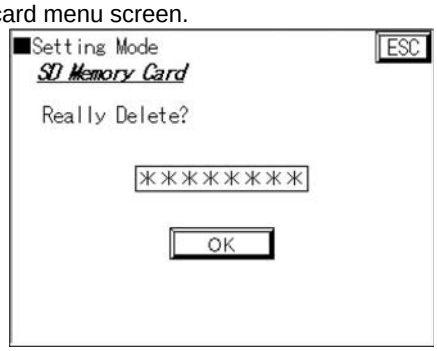
Delete file selection screen

[SD File Delete]



Touching [Delete] key displays the confirmation screen. After you confirmed, touch [OK] key. After deletion, touching [OK] key returns the SD card menu screen.

[Delete]



SD Card Menu

It is used to set whether to display the SD memory card menu or not when the SD memory card is inserted.

- [Automatic] The SD card menu is automatically displayed.
- [Manual] The SD card menu is not displayed. (Go to the SD card menu from the system menu.)

Select either [Automatic] or [Manual]. (Default is [Automatic].)

5.3.9 Operation Security Function

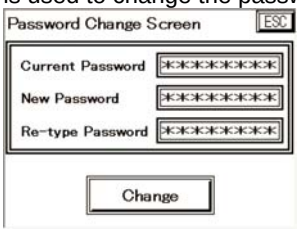
Using this function enables to change passwords for operation security on GT.

Key Point: A switch is required to jump to the screens for changing or managing passwords, which is set using the function or custom switch.
Note) It cannot be set from the system menu on GT.

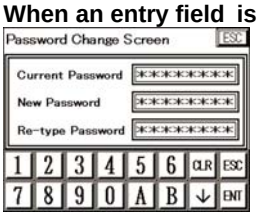
Reference: For information on the settings of password change screen and password management screen, <GTWIN Screen Creation Guide>

Password change screen

It is used to change the password at the security level for operating the screen.



When an entry field is pressed



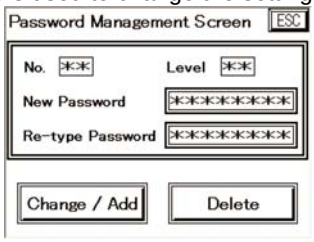
Touching the password entry field displays the keyboard. Enter each password and press [ENT] key.

Current password:	Enter the current password.
New password:	Enter a new password.
Retype password:	Reenter the new password.

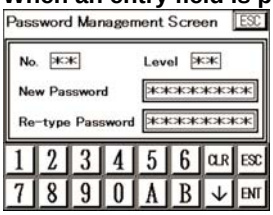
Press [Change] to complete the password change.
Press [ESC] key to return to the previous screen.

Password management screen (Level 15 only)

It is used to change the settings for all the levels at Level 15.



When an entry field is pressed



No.:	Enter the operation security password number.
Level:	If the password has been already set, it is indicated by entering the password number. If the password has not been set, this field is blank.
New password:	Enter a new password.
Retype password:	Reenter the new password.

For changing/adding passwords: Press [Change/add] to complete the password change or addition.
For deleating passwords: Press [Delete] to complete the password deletion. (It is not required to enter passwords.)
Press [ESC] key to return to the previous screen.

Touch panel operation:

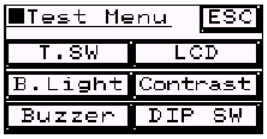
Set: A password can be set in 8 characters or less in capitals.

5.3.10 Setting Mode "Self-Diagnosis" (Test Mode)

Touching the [Test] key on the initial screen of the system menu displays the self-diagnosis screen. This is used to run a hardware check of the memory, buzzers, and other elements of the GT.

Test mode screen

Procedure for bringing up the screen
[Initial screen]
↓
[Test] key



Available functions for each model

Table of test modes A: Available N/A: Not Available

Function name	GT01	GT05	GT11	GT12	GT21	GT30	GT32
Touch switches	A	A	A	A	A	A	A
Backlight	A	A	A	A	A	A	A
Buzzer	A	A	A	A	A	A	A
LCD	A	A	A	A	A	A	A
Contrast	A	N/A	A	N/A	A	A	N/A
DIPSW	A	A	A	A	A	A	A
Brightness	A *5)	A *5)	A *5)	A *5)	A	N/A	N/A
SD	N/A	A	N/A	A	N/A	N/A	A
Sound	N/A	N/A	N/A	N/A	N/A	N/A	A *3)

*3) Available for GT32T1 only.
*5) Included in backlight test.

Touch SW

This runs an operation check of the touch switches.

DIP SW

This runs an operation check of the DIP switches.

Back Light

The backlight color changes.

For 3-color LED (green, red, orange) backlight	Changes in the order of green, red and orange
For white LED backlight	Changes in the order of lighted, lighted out and lighted (weak).
For 3-color LED (white, red, pink) backlight	Changes in the order of white, red and pink.

Buzzer

This runs an operation check of the buzzer.

LCD

This displays a pattern and runs an operation check of the display.

Contrast

Touch the [+] and [-] keys to check changes in the contrast.

SD

This runs an operation check of reading a SD memory card.

Sound

The test sound is played. (Check it with a speaker.)

Touch panel operation:

[RETURN] To complete the settings and return to the previous screen, touch the [ESC] key or the [Initial setting] tab at the top of the screen.

Explanation of this function:

Test mode (self-diagnosis) screen

On the test mode screen of the GT01 and Gt11, the item name of the item that was just tested is highlighted.

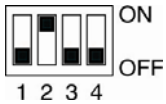
On the test mode screen of the GT21, GT30, GT32 and GT05, a check mark [✓] is displayed to the left of the key switch for items on the Test Menu which have already been tested.

(They are cleared when the screen is returned to the initial screen of the system menu.)

5.3.11 Inhibiting the System Menu Display

In order to prevent unauthorized persons from being able to change GT configuration settings, the GT is set up so that DIP switches can be used to make it impossible to display the system menu.

Operation mode setting switches

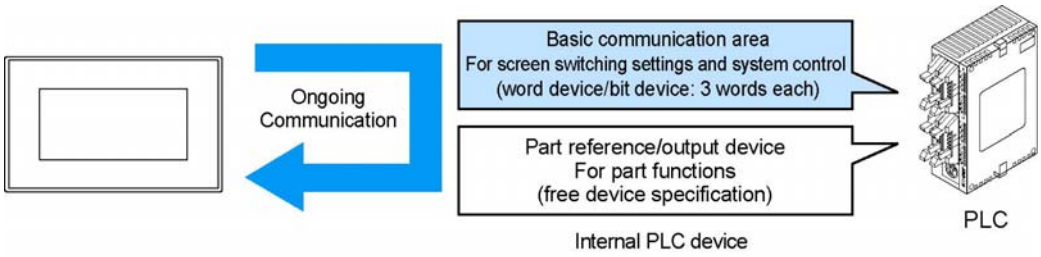


If the second operation mode setting switch is turned on, as shown at the left, access to the system menu is denied.

5.4 Setting the Basic Communication Area Between the GT and PLC

5.4.1 What is the Basic Communication Area?

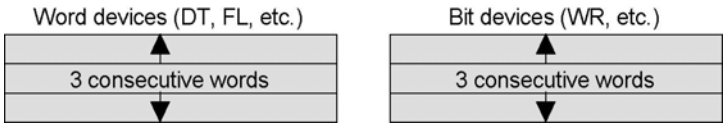
Communication between the GT and PLC is carried out as shown below.



As shown in the illustration, communication is carried out on an ongoing basis between the GT and internal devices in the PLC. Internal PLC devices are divided into the following two devices:

Basic communication area
This area is for system control, such as screen switching settings. PLC devices belong to this area on a fixed basis, and communication is constantly being carried out.

Breakdown of the basic communication area



- **Word device:** For reading devices handled in word units (3 consecutive words)
- **Bit device:** For reading devices handled in bit units (3 consecutive words)

References and output devices for parts
These are devices that are used in parts functions, and can be freely specified by the user. Communication is carried out on an ongoing basis only for those that are currently displayed on the screen and pertain to devices currently in use.

With the GT, before GTWIN screen creation tool is used to specify the devices for parts functions, the “basic communication area” must be determined.
DT0 to DT2 and WR0 to WR2 are set as the default values for the basic communication area, but the initial address can be changed using the following procedure.

Note:
The basic communication area should be used in the PLC ladder program to control the GT.

Reference: <5.2.1 Configuration Settings in “GTWIN”>

5.4.2 Basic Communication Area Map

In order for communication to be carried out between the GT and PLC, an internal device area like that shown below is provided in the PLC. This should be used to control the GT through the PLC ladder program actually being run.
The starting address “N” of the field shown below is specified in the GT configuration settings of GTWIN screen creation tool, and is then sent to the GT.

Word devices

Word position	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
N+0	Screen No. specified by PLC (area read by GT from PLC)															
N+1	Usage prohibited															
N+2	No. of currently displayed screen (area in which data is written from GT to PLC)															

Explanation of system area

Screen No. specified by PLC: The screen number specified on the GT is specified from the PLC in hexadecimal format.

No. of currently displayed screen: The number of the screen currently displayed on the GT is written to the PLC in hexadecimal format.

Bit devices

Bit position	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
Digit Position	3				2				1				0			
Byte position	Higher bytes								Lower bytes							
N+0	BZ	Forced display flag	Back-light valid flag	Back-light Flash-ing	Back-light Color		Touch sound dis-able flag	Reverse display flag								
N+1	Usage prohibited															
N+2												Pass-word screen display flag	login screen display flag	BAT LOW flag	BAT	Data Input in Pro-gress flag

Explanation of basic communication area

BZ: This turns on the buzzer.

Forced-display flag: At the rise when the bit is turned on, the screen specifed by the PLC is forcibly displayed. (This is executed only when at the rise of the bit.)

Backlight Valid flag: When the bit is turned on, the backlight flashing/backlight color control becomes effective.

Backlight Flashing: 0: Lighted (normal), 1: Flashing

Backlight Color:

Model	Backlight color	State of bit			
		00	01	10	11
GT01	3 colors	Off	Green	Red	Orange
	White		Lighted	Off	Lighted (weak)
GT01R	3 colors		White	Red	Pink
GT05M	3 colors		White	Red	Pink
GT05G	3 colors		Green	Red	Orange
GT05S	White		Lighted	Off	Lighted
GT11	3 colors		Green	Red	Orange
	White		Lighted	Off	Lighted (weak)
GT12M1	3 colors		White	Red	Pink
GT12G1			Green	Red	Orange
GT21	-		Lighted	Off	Lighted
GT30	-		Lighted	Off	Lighted
GT32	-		Lighted	Off	Lighted

Touch sound disable flag: (Except GT30) Turning on the bit sets silent operation when touching the buttons.

Reverse display flag (Monochrome models) Turning on the bit reverses the black-and-white display of the whole screen.

Data Input In Progress flag: This is 1 while data is being input, and 0 when data input has been completed.

BAT: (Except GT01) This goes on if clock data and Hold PLC Device data held in the SRAM are not being backed up normally. (This bit also goes on if the SRAM is not backed up by the internal secondary battery. The "  " mark is displayed at the bottom right of the screen. *1)

BAT LOW flag: (Except GT01) This goes on when the battery is running low. Please replace the battery with a new one within a week after this bit went on. (The "" mark for GT05, GT11, GT21 and GT32 and the "" mark for GT30 is displayed at the bottom right of the screen. *1)

*1 When the battery error display is set to Off, the "" or "" mark will not be displayed.

*2 The BAT and BAT LOW flags activate in the both cases that the battery error display is set to "On" and "Off".

Login screen display flag: (GT05, GT12, GT32) This flag turns to 1 when displaying the login screen, and turns to 0 when finishing the login screen display.

Password screen display flag: (GT05, GT12, GT32) This flag turns to 1 when displaying the screen for changing the password or for password management (for administrator's exclusive use), and turns to 0 when finishing the screen display.

5.4.3 Touch Sound disable Flag

The touch sound sounds when the setting in the GT configuration setting has been enabled, however, turning on the touch sound disable flag enables to set not to sound.

Operations of touch sound disable flag

Basic communication area Touch sound disable flag	GT configuration setting Touch sound	Touch sound
OFF	Disable	Not sound
	Enable	Sound
ON	Disable	Not sound
	Enable	Sound

Note:

Buzzers other than the touch sound cannot be set.

- The buzzer specified by the buzzer bit in the basic communication area.
- When starting the system menu.
- The buzzer test in the system menu.

Applicable versions

GT series	Firmware version of GT
GT01	Ver. 1.35 or later
GT05	Ver. 1.20 or later
GT11	Ver. 1.25 or later
GT12	Ver. 1.00 or later
GT21	Ver. 1.15 or later
GT32	Ver. 1.30 or later

Note) The upgrade of GTWIN is not required.

5.4.4 Bit Device Functions in Basic Communication Area

In order for communication to be carried out between the GT and PLC, an internal device area like that shown below is provided in the PLC. This basic communication area contains two types of devices: word devices, which are used to handle screen numbers and other data, and bit devices, which are used for bit information. The various bits of the bit devices are turned on and off from the PLC, and can be used to control various GT operations.

Changing the backlight color

For monochrome type

Bits A and B of the first word of the bit device are used to change the backlight color. The color of the backlight can be changed by turning these bits on and off. To make these settings valid, howeve, Bit D (Backlight Valid flag) must always be turned on at the same time.

Bit status		Backlight color		
B	A	3-color LED backlight (Green, red, orange)	1-color LED backlight	3-color LED backlight (White, red, pink)
OFF	OFF	Off	Off	Off
OFF	ON	Green	Lighted	White
ON	OFF	Red	Off	Red
ON	ON	Orange	Lighted (weak)	Pink

For color type

The A and B bits of the initial bit device word are used to turn the backlight on and off. These bits can be changed to change the backlight illumination status. To make these settings valid, however, Bit D (Backlight Valid flag) must always be turned on at the same time.

Bit status		Backlight color
B	A	
OFF	OFF	Off
OFF	ON	Lighted
ON	OFF	
ON	ON	

Using a flashing backlight

Bit C of the first word of the bit device is used to make the backlight flash. The backlight status can be changed by turning this bit on and off. To make this setting valid, however, Bit D (Backlight Valid flag) must always be turned on at the same time.

Bit status	Backlight color
C	
OFF	Lighted
ON	Flashing

Making the buzzer sound

Bit F of the first word of the bit device is used to make the buzzer sound. The buzzer status can be changed by turning this bit on and off.

Bit status	Buzzer status
F	
OFF	Stopped
ON	Buzzer output

Data Input in Progress flag

With the GT, while data is being input from the screen keyboard part, Bit 0 of the third word of the bit device is on.

Applications should be set up so that, when this bit is on, the screen cannot be chagned from the PLC.

 **Reference:** <Basic Communication Area Maps for each GT models>

Chapter 6

GT Link Function

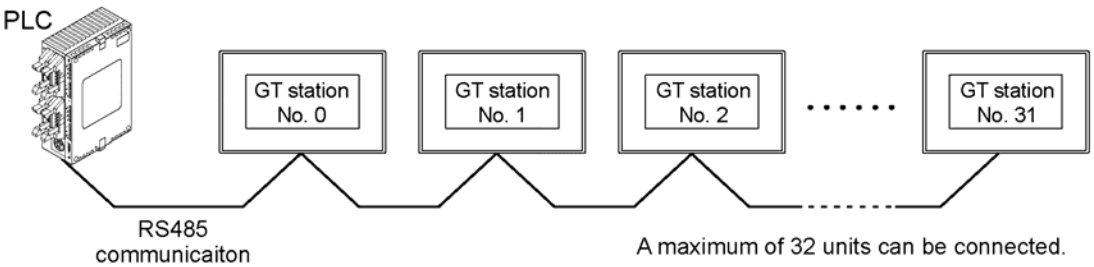
6.1 Features

GT link function is a function that enables more than one GT to connect with one PLC.

Usable GT
- GT05 Ver.1.1 or later
- GT12 Ver.1.0 or later
- GT32 Ver.1.2 or later

Usable PLC
- FP-X, FP-X Communication cassette, AFPX-COM3, AFPX-COM4, AFPX-COM6
- FPΣ, FPΣ Communication cassette, AFPG803, AFPG806
- FP2/FP2SH, FP2-MCU, FP2 Communication block AFP2805

Features
- It enables GT to connect with a PLC without communication program. (Setting station numbers is required on the PLC.)
- A maximum of 32 GT units can be connected to 1-ch RS485 of one PLC. (PLC side: Computer link) (As the connected units increases, the response speed gets slower. Recommended number of units: 4 units)
- A setting for exclusively using communication with a PLC to change settings or perform the through function on GT is available.
- Priority can be selected for updating the disaply parts such as lamp and message parts, or for operating switches.
- The through function can be used from one GT in a GT link.

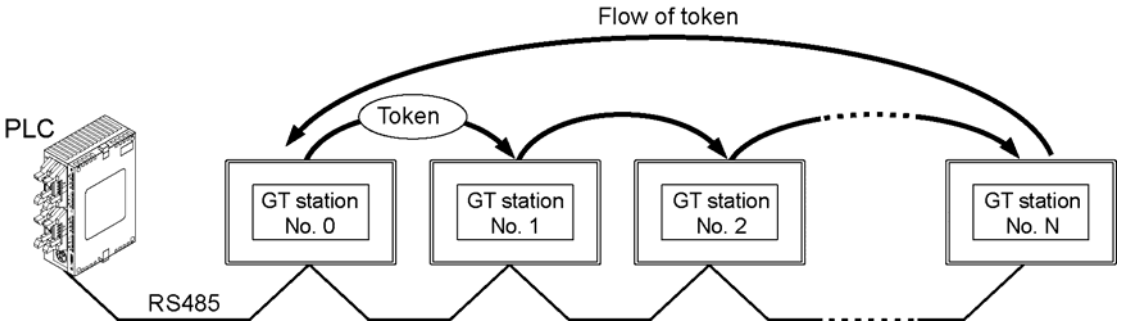


Reference: <Chapter 6 GT Link>

6.2 Priority Operation Mode

6.2.1 Token Passing Method

The connected GT communicates using a token passing method.
The communication is as follows.

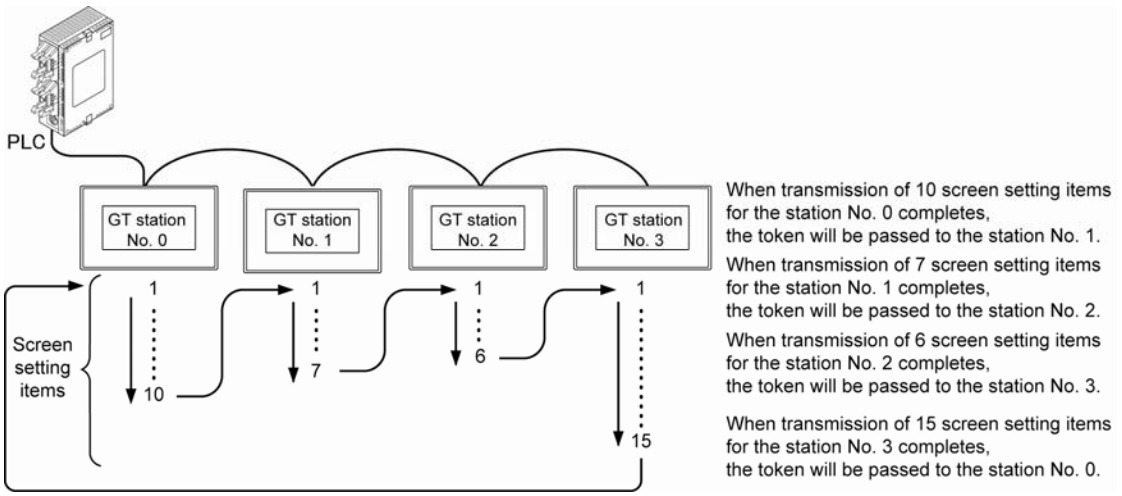


With the GT link function, GT units communicate with a PLC passing a token (right to communication with a PLC) between them sequentially.
There are two methods for the passing order, which are the "setting to give priority to the display of each GT" (Display priority) and "setting to give priority to the operation of each GT" (Operation priority).
When the GT that has received the token completes necessary communication with the PLC, it will pass the token to the next GT.

Passing the token is performed from the unit with the smallest station number in ascending order.
(Wiring GT units is not necessary in the order of station numbers.)

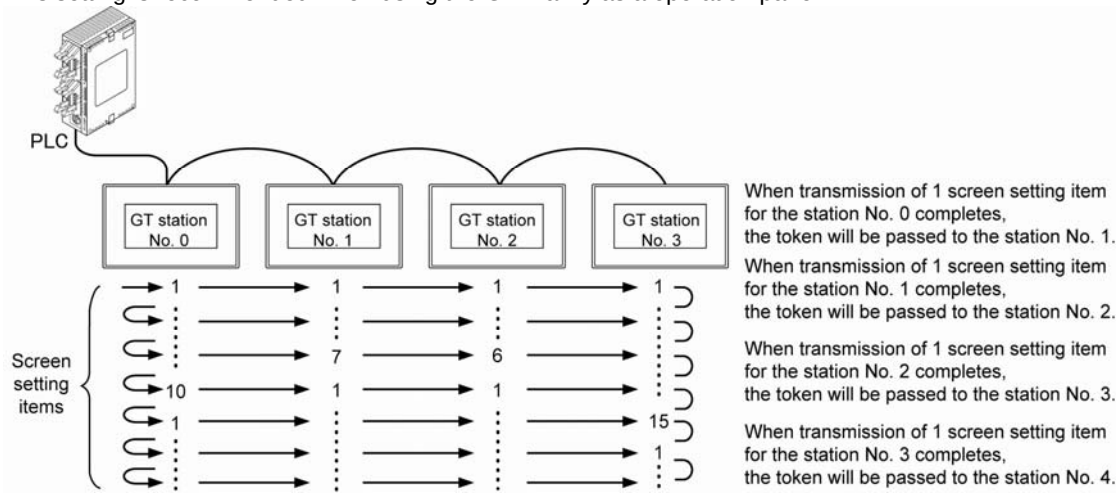
6.2.2 Display Priority

The GT performs all the communication necessary for updating the screen with the PLC, and passes the token to the next GT.
As the number of token passing is a few, updating displays becomes faster.
This setting is recommended when using the GT mainly as a monitor screen.



6.2.3 Operation Priority

The GT pass the token to the next GT every time it performs one communication with the PLC necessary for updating the screen.
As the time from passing the token until the next GT receives it is short, the response in the operation is faster.
This setting is recommended when using the GT mainly as a operation panel.



Note: Use all connected GT units in the same priority mode.
If more than one mode are used, the "Priority Mode" setting has no effect.

6.3 Exclusive Communication With PLC

This is a setting enables one GT to exclusively communicate with the PLC by setting not to pass the token to the next GT for acertain period of time.
As other GT units than the GT communicating with the PLC do not communicate, there is no time lag.
Note) When the PLC is used exclusively by a GT, other GT units cannot communicate with the PLC.

Setting for Exclusive Communication with PLC
The setting is made from the following 3 items.
- GT exclusive area in the control device area
- Exclusive communication with PLC when operating touch switch
- Momentary switch operation

Reference: For information on the setting of control device area, <6.4.3 Control Device Area>

Note: When using an alarm list and line graph
Although the alarm list and line graph can be used, data may not be displayed properly if there is a GT exclusively communicating with a PLC or the timing of communication is not right.

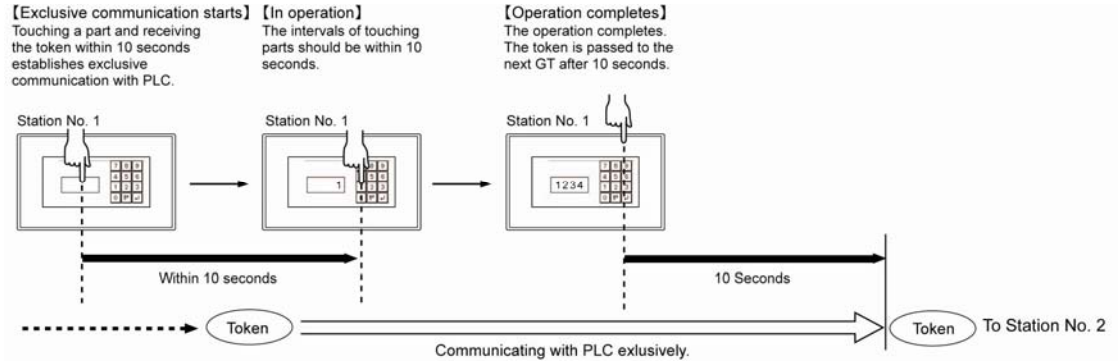
6.3.1 Exclusive Communication With PLC When Operating Touch Switch

The GT can exclusively communicate with a PLC for a certain period of time after touching an operable part on the screen.
The GT starts to count the occupied time when the finger was released from the touching part.

Operable part on the screen

Type	Condition
Switch	When a valid condition is not set or when a valid condition is set
Function switch	
Custom switch	
Data part	When setting to "Input"
Alarm list part (including guidance)	–
Keyboard part	–

When setting "Exclusive time after operation" to 10 seconds



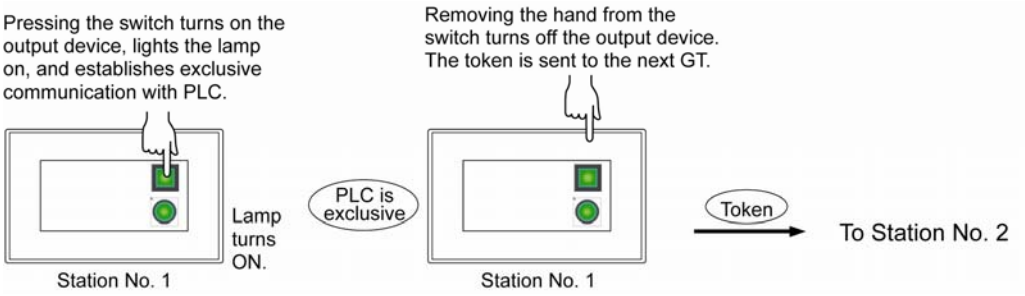
Note) Specify a longer exclusive time if the interval between the touch operations takes long.
(It can be set in the range of 1 to 255 seconds. * Default is 10 seconds.)

If the screens of more than one GT are touched simultaneously, the GT that firstly receives the token will communicate.
Other GT units cannot communication with the PLC.

6.3.2 Momentary Switch Operation

Touching the momentary switch turns on a output device, and releasing the hand from the switch turns off the output device. However, with the GT link function, the output device cannot be turned off until the GT receives the token even if the hand released from the switch.
Therefore, make the setting to enable exclusive communication with PLC when turning on the output device, and to simultaneously turn off the output device when releasing the hand from the switch.

"Exclusive communication with PLC when pressing momentary switch"
The GT communicates with the PLC exclusively when turning on the output device to enable the output device to be simultaneously turned off when releasing the hand from the switch.



The output device turns on when the momentary switch is on and the GT has received the token.
When releasing the hand from the switch, the output device will be off and the token will be passed to the next GT.
Note) While the GT is communicating the PLC exclusively, the communication between other GT units and the PLC stops. However, it is possible to transmit information on the on/off-state to the PLC quickly.

"No exclusive communication with PLC"
Although the momentary switch is on, the GT does not communicate with PLC exclusively.
The output device turns on when the momentary switch is on and the GT has received the token, and the token will be passed to the next GT. The output device will turn off when releasing the hand from the switch and the GT receives the token again.
Note) Although the communication between other GT units and the PLC does not stop, there will be the time lag of turning off the output device.

Key Point:
The momentary switch operation setting can be also used when two kinds of settings are specified on more than one GT.

6.3.3 "Display Message in Stand-by Mode"

Touching a part on the GT that has no token makes the GT be in the standby state.
If touching the parts more in the standby state, a message "Please wait" appears.
(The first touch operation is memorized in the GT. The GT activates when it has received the token, however, it does not activate by the second touch operation or later.)

Note: The message "Please wiat" disappears in about 2 seconds.

6.4 Settings

6.4.1 Communication Parameters

Item	Setting
Baud rate	115200 bps
Data bit	8
Stop bit	1
Parity	Odd

Note) Communication is not established with any other settings.

6.4.2 Station Numbers

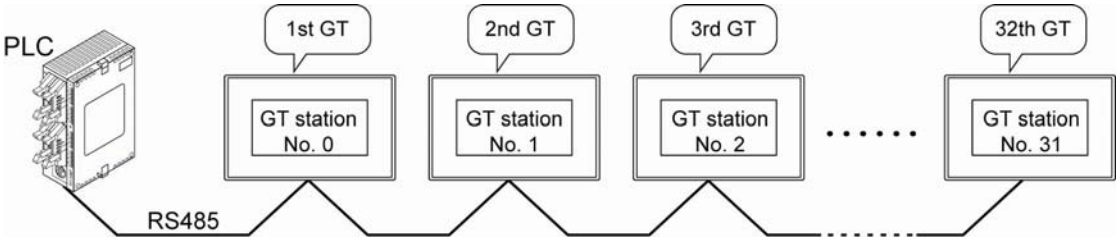
Various GT units are recognized by assigning station numbers to each of them. (No. 0 to 31)

Station number setting

Specify station numbers consecutively from number 0.

Note) The same number cannot be specified for more than one GT.

[Example] When connecting three GT units, specify the station numbers with 0 to 2.
(Wiring with the PLC is not necessarily done from the station number 0.)



Note:

- When the same station number is specified for more than one GT, GT link communicaiton cannot be established.
- If the specified station numbers are not consecutive numbers, the startup speed gets slower.

6.4.3 Control Device Area

Each station number corresponds to each bit in the control device area of GT link.
Setting the designation area on the PLC enables to control the state of GT link for every station number.
Also, the states of GT link for every station number can be checked by monitoring the monitor area on the PLC side.

Control device (8-word area is used.)

Key Point: Use the device hold area in the PLC for the control device area.

Connected GT area
- Connected GT designation area:
The bit corresponding to the GT to communicate is turned on on the PLC.
Note) This area must be specified on the PLC.

- Connected GT monitor area:
The state of the GT that is properly communicating can be monitored.
ON: Can communicate
OFF: No communication

Exclusive GT area
- Exclusive GT designation area:
Turning on the bit for the designated station number enables the GT with its station number to communicate with PLC exclusively.

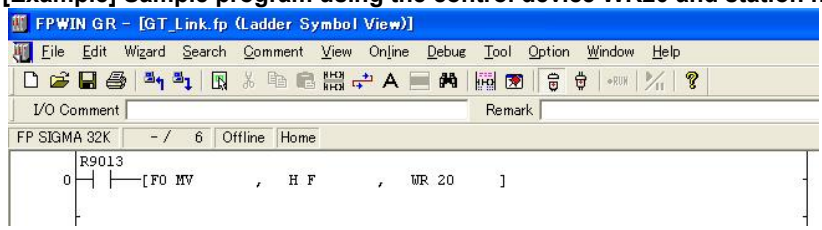
- Exclusive GT monitor area:
The bit for the station number of GT that exclusively communciates with PLC turns on. Monitoring this area shows which GT exlusively communicates with the PLC.

GT station number list for control device area

Word position	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
N+0	Connected GT designation area (Station numbers 0 to 15 correspond to bits 0 to 15 of N+0 word, and station numbers 16 to 31 correspond to bits 0 to 15 of N+1 word.)															
N+1																
N+2	Connected GT monitor area (Station numbers 0 to 15 correspond to bits 0 to 15 of N+2 word, and station numbers 16 to 31 correspond to bits 0 to 15 of N+3 word.)															
N+3																
N+4	Exclusive GT designation area (Station numbers 0 to 15 correspond to bits 0 to 15 of N+4 word, and station numbers 16 to 31 correspond to bits 0 to 15 of N+5 word.)															
N+5																
N+6	Exclusive GT monitor area (Station numbers 0 to 15 correspond to bits 0 to 15 of N+6 word, and station numbers 16 to 31 correspond to bits 0 to 15 of N+7 word.)															
N+7																

Note:
Do not write anything in the connected GT monitor area and exclusive GT monitor area as they are controlled by GT.

[Example] Sample program using the control device WR20 and station numbers 0 to 3



6.5 Connection with PLC

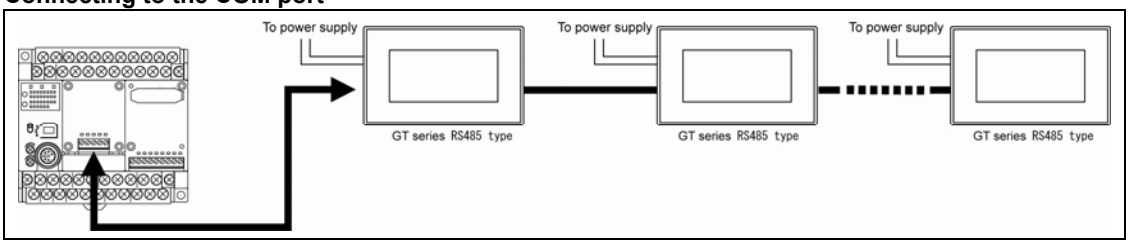
6.5.1 Wiring of Power Supply

It takes more than 5 seconds for all GT units to be operable after turning on the power supply of GT.
(The time varies according to conditions and the number of connected GT units.)

As for the power supply of GT, it is recommended to use the wiring that enables multiple GT units to be simultaneously turned on.
If the power supplies of multiple GT units cannot be simultaneously turned on after turning on the power supply of devices such as a PLC, an error message will be displayed and it may take some time to make communication to be established.
(The error display disappears when all the GT units become operable.)

6.5.2 Connection with FP-X

Connecting to the COM port



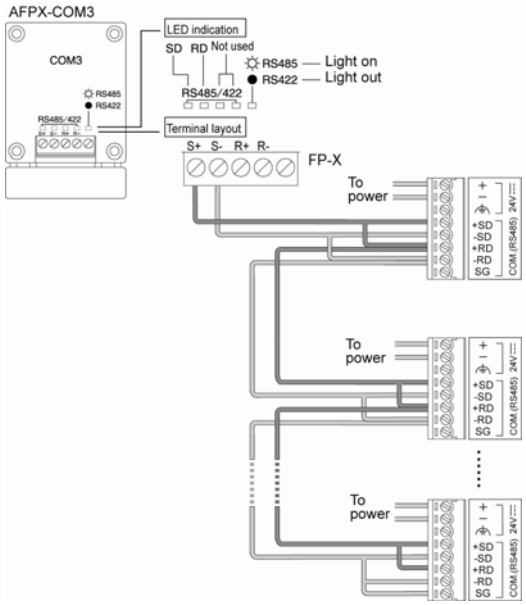
PLC	PLC communication cable	Programmable display	
FP-X	Loose-wire cable	24 V DC	RS485 type

Setting the communication conditions

Item	Setting
Communication mode	Computer link
Baud rate	115200 bps
Data bit	8
Stop bit	1
Parity	Odd
End code	CR
Start code	No STX
Unit No.	1
Modem No.	No connection

Note:
Use a baud rate of 115200 bps. Any other baud rates cannot be used.

Connecting to the 1-channel RS485/RS422



PLC side

Pin Name	Signal name
S+	S+
S−	S−
Not used	
Not used	
Not used	

*Turns on No.1 to No.4 of the switch at the back of the AFPX-COM3.

To power supply

GT side (RS485) GT station No.0

Pin No.	Signal Name
1	+
2	−
3	FG
4	+SD
5	-SD
6	+RD
7	-RD
8	E

To power supply

GT side (RS485) GT station No.1

Pin No.	Signal Name
1	+
2	−
3	FG
4	+SD
5	-SD
6	+RD
7	-RD
8	E

To power supply

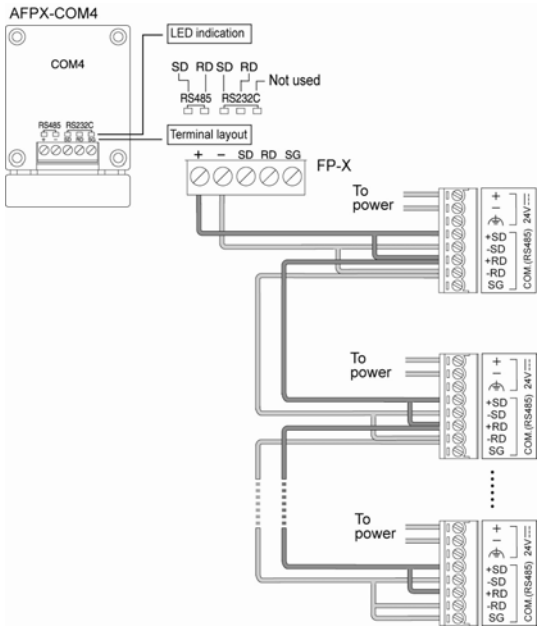
GT side (RS485) GT station No.N

Pin No.	Signal Name
1	+
2	−
3	FG
4	+SD
5	-SD
6	+RD
7	-RD
8	E

Short

* As for the temrinal station, short the "E" terminal and "-RD".

Connecting to the 1-channel RS485 and 1-channel RS232C



PLC side

Pin Name	Signal name
S+	+
S−	−
SD	SD
RD	RD
SF	SG

* Turn on the switch at the back of the AFPX-COM4.

To power supply

GT side (RS485) GT station No. 0

Pin No.	Signal Name
1	+
2	−
3	FG
4	+SD
5	-SD
6	+RD
7	-RD
8	E

To power supply

GT side (RS485) GT station No. 1

Pin No.	Signal Name
1	+
2	−
3	FG
4	+SD
5	-SD
6	+RD
7	-RD
8	E

To power supply

GT side (RS485) GT station No. N

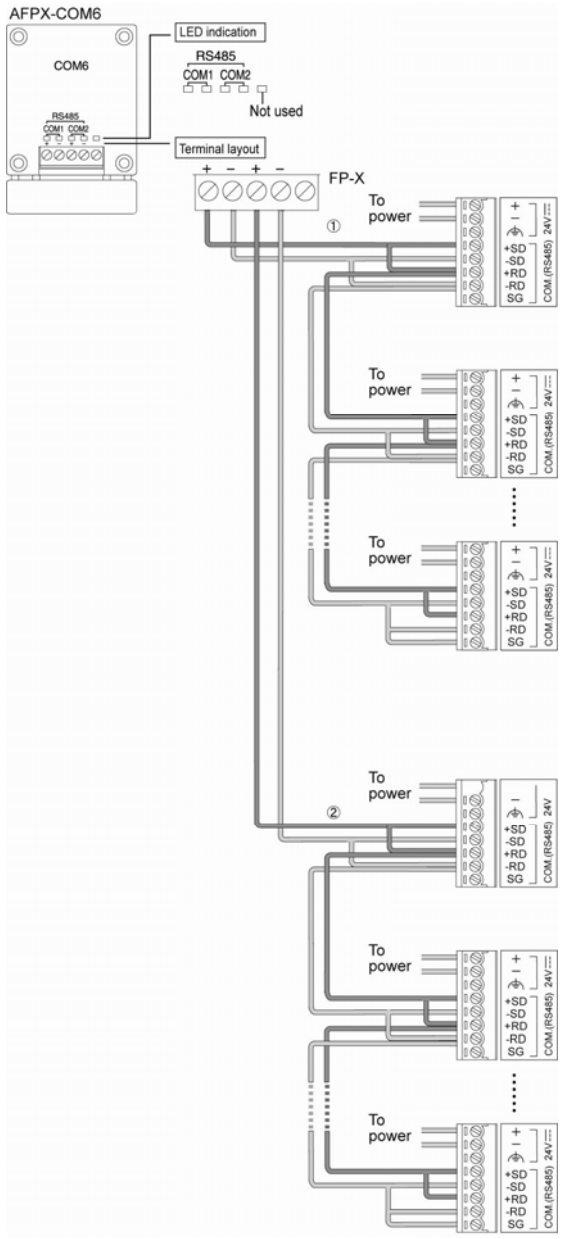
Pin No.	Signal Name
1	+
2	−
3	FG
4	+SD
5	-SD
6	+RD
7	-RD
8	E

Short

* As for the temrinal station, short the "E" terminal and "-RD".

Connecting to the 2-channel RS485

GT units can be connected to those 2 channels.



PLC side

Pin No.	Signal name
+(COM1)	+
−(COM1)	−
+(COM2)	+
−(COM2)	−
Not used	

* Set the switch on the back of AFPX-COM6.

To power supply

GT side (RS485) GT station No.0

Pin No.	Signal Name
1	+
2	−
3	FG
4	+SD
5	-SD
6	+RD
7	-RD
8	E

GT side (RS485) GT station No.1

Pin No.	Signal Name
1	+
2	−
3	FG
4	+SD
5	-SD
6	+RD
7	-RD
8	E

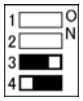
GT side (RS485) GT station No.N

Pin No.	Signal Name
1	+
2	−
3	FG
4	+SD
5	-SD
6	+RD
7	-RD
8	E

Short

* As for the temrinal station, short the "E" terminal and "-RD".

AFPX-COM6 rear switch settings

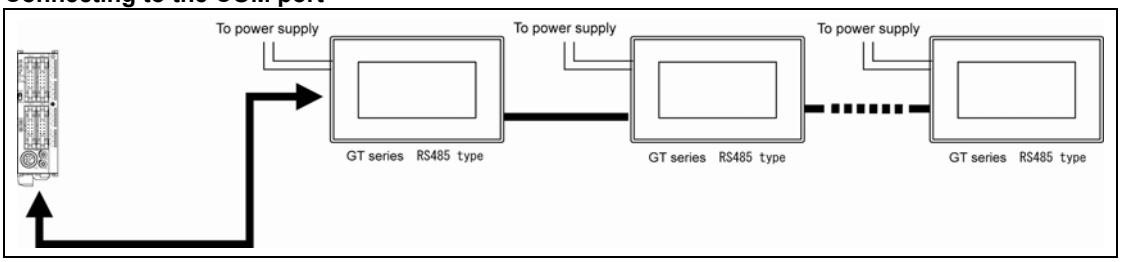
Setting	Terminal station	Setting	Baud rate Note)
	When COM1 is terminal unit		COM2: 115200 bps
	When COM2 is terminal unit		COM2: 115200 bps

Note) The baud rate should be set by the system register for the COM1, and by the switch and system register both for the COM2.

Reference: <FP-X User's Manual ARCT1F409E>
For information on the RS485 connection,
<4.2.10 Precautions When Communicating with RS485>

6.5.3 Connection with FPΣ

Connecting to the COM port



PLC	PLC communication cable	Programmable display	
FPΣ	Loose-wire cable	24 V DC	RS485 type

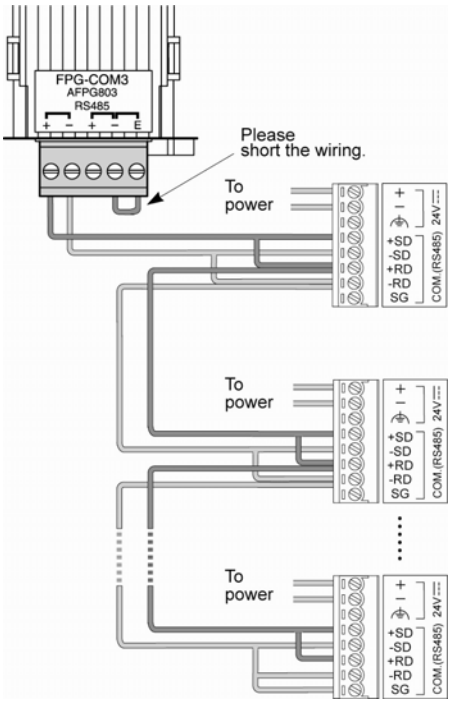
Setting the communication conditions

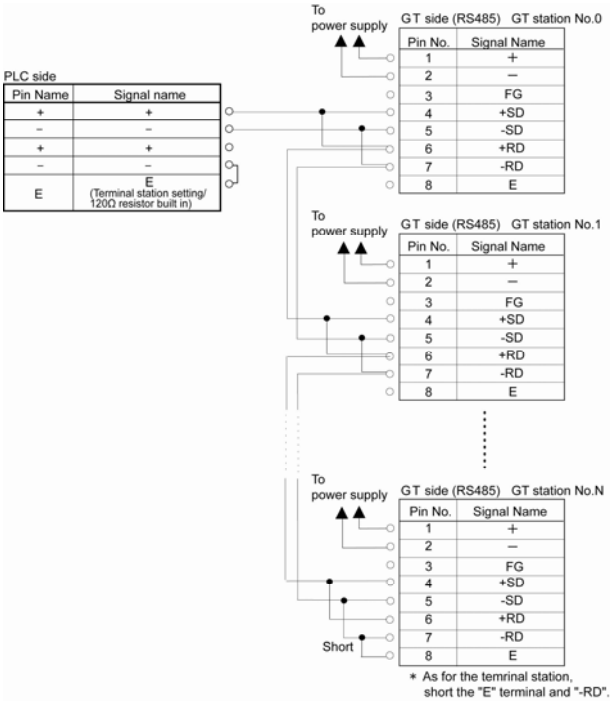
Item	Setting
Communication mode	Computer link
Baud rate	115200 bps
Data bit	8
Stop bit	1
Parity	Odd
End code	CR
Start code	No STX
Unit No.	1
Modem No.	No connection

Note:

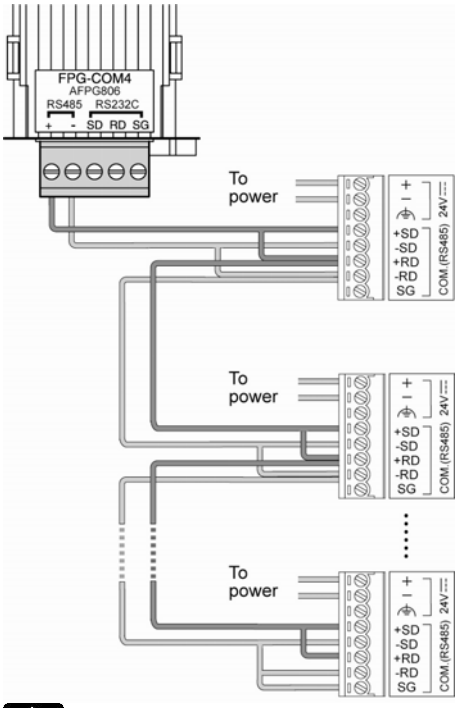
Use a baud rate of 115200 bps. Any other baud rates cannot be used.

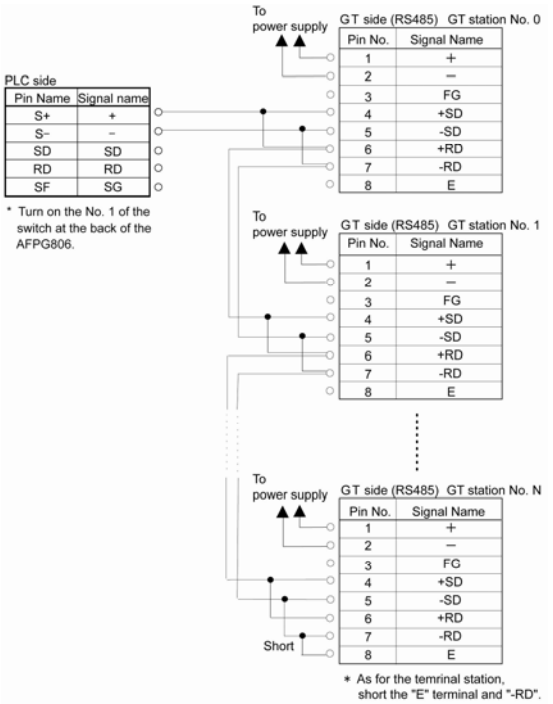
Connecting to the COM3 cassette of FPΣ





Connecting to the COM4 cassette of FPΣ

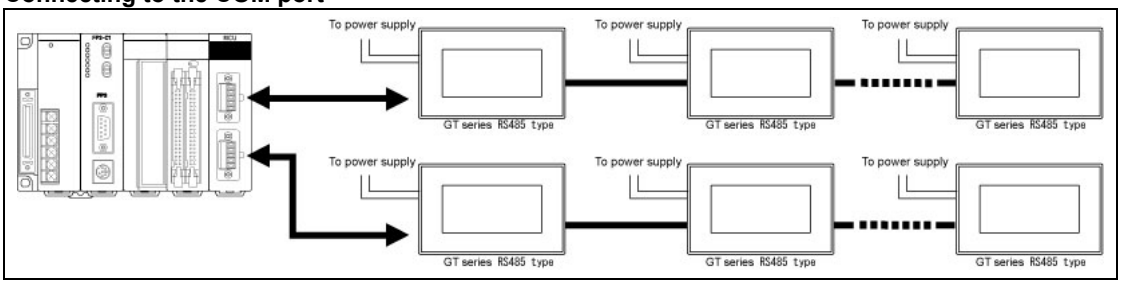




Reference: For information on the RS485 connection,
<4.2.10 Precautions When Communicating with RS485>

6.5.4 Connection with FP2/FP2SH

Connecting to the COM port



PLC	PLC communication cable	Programmable display	
FP2 FP2SH	Loose-wire cable	24 V DC	RS485 type

Note) FP2 Multi Communication Unit and FP2 communication block (RS485) are necessary for the GT link connection with FP2/FP2SH.

Setting the communication conditions

Item	Setting
Communication mode	Computer link
Unit No.	1
Baud rate	115200 bps
Data length	8 bits
Parity	Odd
Stop bit	1 bit
Modem initialization	Not initialize

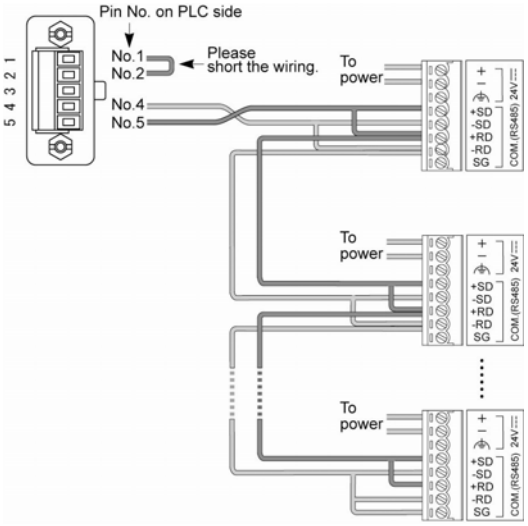
Note:

Use a baud rate of 115200 bps. Any other baud rates cannot be used.

Connecting to the FP2 communication block (RS485)

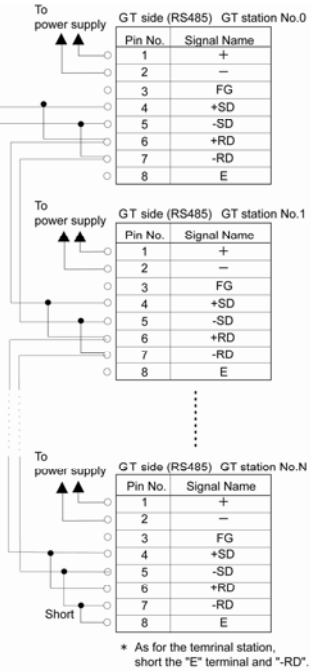
GT units can be connected to one or two communication blocks respectively.

COM1 port



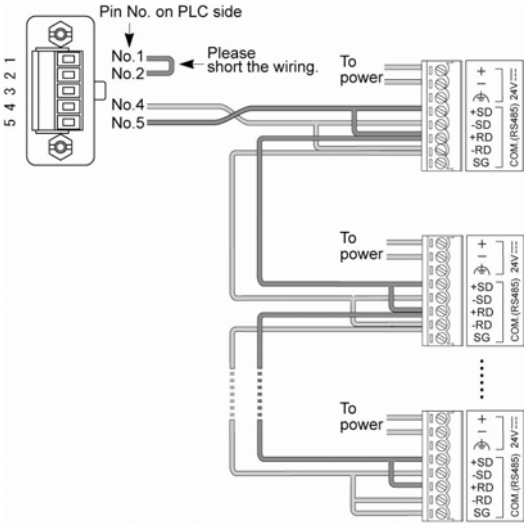
PLC side (COM1 port)

Pin Name	Signal name
E	E (Terminal station setting/ 120Ω resistor built in)
−	−
+	+
−	−
+	+



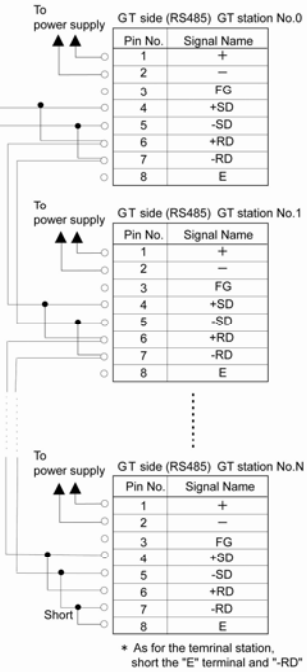
∗ As for the temrinal station, short the "E" terminal and "-RD".

COM2 port



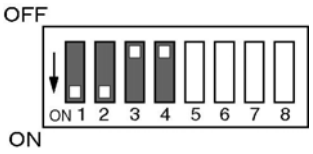
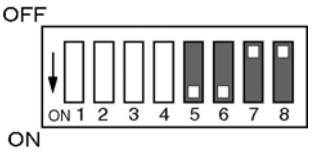
PLC side (COM2 port)

Pin Name	Signal name
E	E (Terminal station setting/ 120Ω resistor built in)
−	−
+	+
−	−
+	+



∗ As for the temrinal station, short the "E" terminal and "-RD"

FP2 Multi Communication Unit rear switch settings

	Port	COM1				COM2			
	Switch No.	1	2	3	4	5	6	7	8
Communication mode	Computer link	ON	ON			ON	ON		
Baud rate	115200 bps			OFF	OFF			OFF	OFF
Setting									

Note) The baud rate shoud be set by the switch the system register both.

Reference: <FP2 Multi Communication Unit Manual ARCT1F396E>

6.6 Setting on GTWIN

6.6.1 Basic Setup

As multiple GT units are connected in a GT link, it is necessary to change the device values in the configuration setting for every station number.

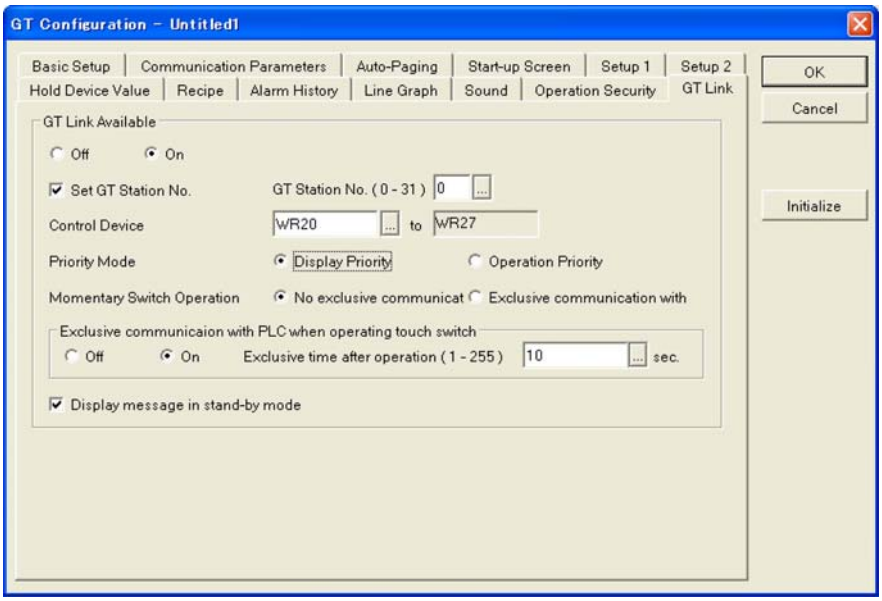
Devices that device values are set for every station number

Configuration setting tab	Device
Basic Setup	Basic communication area
Operation security	Security level output
Hold device value	Hold PLC device value
Alarm history	Alarm history control
Line graph	Line graph control
Recipe	Recipe control

6.6.2 Setting of GT Link Function

Clicking [GT Link] tab in [GT Configuration] dialog box shows the following screen.

"GT Link" screen



GT Link Available

- **Off** The GT link function is not used.
- **On** The GT link function is used.

When selecting "On" for the above "GT Link Available", the setting items are shown.

Reference: Priority mode <6.2 Priority Operation Mode>

- Set GT station No.:
GT station No. (0 - 31)

Checking the box shows the item of GT station number.
Click the button, and select a station number to be set for the GT from the range of 0 to 31.

- Control device:

Set the devices to be used for the GT link.

- Priority mode:

Select the method for passing a token to be used for the GT link.

Display priority

When all necessary communication for the screen settings specified for every GT completes, the token will be transferred to the next GT.

Operation priority

When one communication for the screen settings specified for every GT completes, the token will be transferred to the next GT.

- Momentary switch operation:

Set to enable exclusive communication with PLC while the momentary switch is being pressed, and to simultaneously turn off the output device when releasing the hand from the switch.

- Exclusive communication with PLC when operating touch switch

The GT can exclusively communicate with a PLC for a certain period of time after touching an operable part on the screen.

Exclusive time after operation (1-255)]

Set the exclusive time.

- Display message in stand-by mode:

Touching a part on the GT that has no token makes the GT be in the standby state. Set to display the "message in stand-by mode" If touching the parts more in the standby state.

Note:

- Specify station numbers consecutively from number 0. (The same station number cannot be used for multiple units.）
- Use the device hold area in the PLC for the control device area.
- In the operation priority mode, make the same settings for all station numbers.

6.7 Configuration Setting on GT

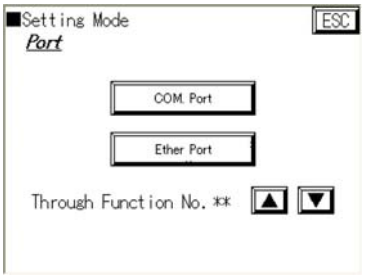
6.7.1 Setting Mode "Communication Parameters"

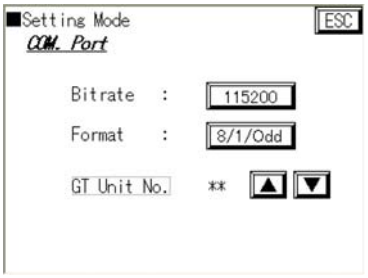
Communication parameters and station numbers can be set on GT.
Touching the [Setting Menu] key on the initial screen of the system menu and touching the [Port] key in the setting mode menu displays the port selection screen. Selecting [COM. Port] displays the setting screen for the communication parameters of COM port.

GT link Communication parameters and station number settings

Procedure for bringing up the screen

[Initial screen]
↓
[Setting Menu]
↓
[Port]
↓
[COM. Port]





Bitrate: PLC baud rate
This sets the baud rate for communication with an external device (PLC) connected to the GT.
Each time the [Function] key is pressed, the baud rate switches in the sequence of 9600, 19200, 38400, 57600, 115200.

Set 115200 bps for the GT link. Any other baud rates are not available.

Format: Transmission format
This sets the communication parameters (data length, stop bits, parity) for the external device (PLC) connected to the GT.
The items displayed are: Data length/Stop bit/Parity, and each time the [Function] key is pressed, the display switches in the sequence of: [7/1/None], [7/1/Odd], [7/1/Even], [8/1/None], [8/1/Odd], [8/1/Even].

Set [8/1/Odd] for the GT link. Any other settings are not available.

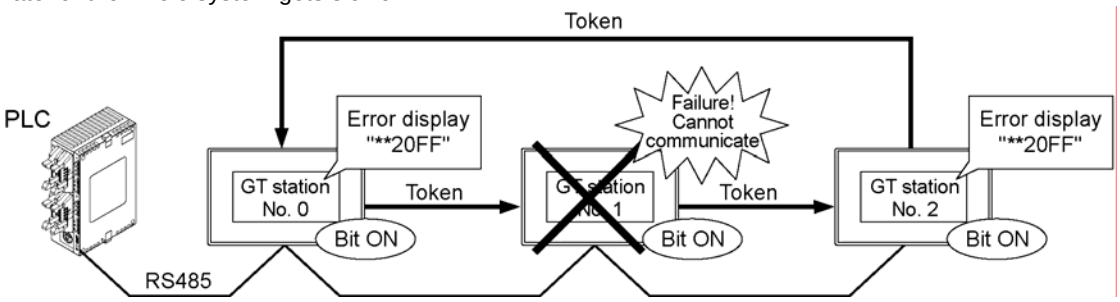
GT Unit No.: Station number
This sets the station number for the GT. The numbers in a range of 0 to 31 can be input.

Touch panel operation:
[Return] To complete the settings and return to the previous screen, touch the [ESC] key.

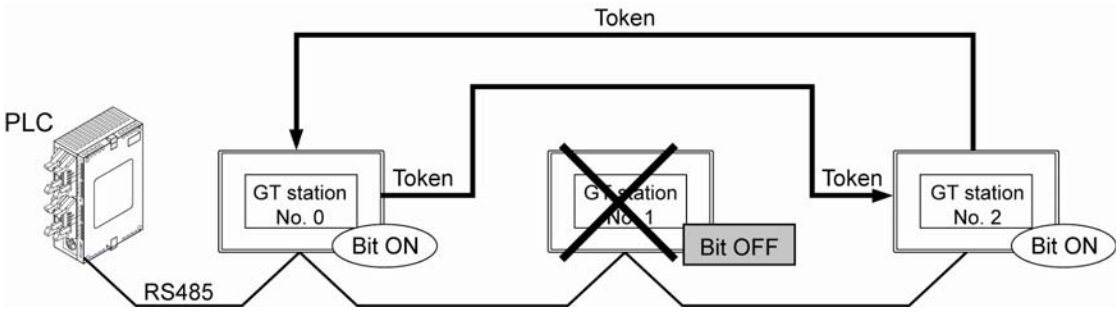
6.8 What to Do If Something Unusual Occurs

6.8.1 If You Want to Except the Faulty GT From the GT Link Without Removing It

If the bit corresponding to the GT station number is OFF in the connected GT monitor area although it is ON in the connected GT designation area, "**20FF" is displayed on the other GT units.
As there is a GT that cannot communicate, it takes some time for transferring the token and the baud rate for the whole system gets slower.



Turn the bit corresponding to the station number of the faulty GT off in the connected GT designation area.



As communication is performed without transferring the token to the GT that the corresponding bit is off, it has no effect on the baud rate.

Key Point: If the station number 2 of a normal GT is turned off, "2000" will be displayed on this GT.**

6.8.2 Error Codes

Code No.	Content	Cause and solution
**2000	Connected GT designation area error The bit corresponding to the connected GT in the connected GT designation area.	The bit in the connected GT designation area corresponding to the station number of the connected GT is not on. Check the connected GT designation area.
**20FF	Token error There is a GT unresponsive to the token.	When the error code is indicated for a certain period of time after the power supply turned on.: 1. The timings for turning on multiple GT units are different. Arrange the wiring that enables the power supplies to be simultaneously turned on. 2. The screen displays for all GT units have not completed. The error code disappears when the screen displays for all GT units have completed. 3. The settings for the startup screen display vary. Make the same setting for all the connected GT units. When the error code is always indicated: 1. There is an unconnected or faulty GT. Check if there is a GT indicating [**20FF]. Reconnect the GT, or turn off the bit in the connected GT designation area. 2. The communication parameters are not specified correctly. Check the baud rate and transmission format for the GT. 3. The same station number is used for more than one GT units. Check the station number setting of the connected GT units. 4. Another GT is reading a SD card. The indication disappears when reading the SD card has completed.

Chapter 7

Troubleshooting

7.1 What to DO If Something Unusual Occurs (GT01/GT11/ GT21)

Problem	Cause	Solution
Screen is blank	1) Power is not on.	1) Supply the power supply to unit as per specifications.
	2) (When only lamp and message parts are configured to the base screen) Value of substitute reference device value does not exist in substitute data.	2) Check the address of the substitute reference device and the device values on the PLC side.
Error code [ER**] appears at the top right of the screen	An error has occurred in communication between the GT and an external device (e.g. PLC).	Refer to <7.4 Troubleshooting Error Codes>.
Screen displays [No Screen data]	There is no base screen data in the GT. (Appears even when GT configuration data exists.)	Transfer base screen data from GTWIN.
Screen displays [Screen No. Error]	1) Screen settings from the PLC, the GT's switch part or the auto-paging indicate an unregistered screen number.	1) Create and register screen content or specify the correct screen number.
	2) When bringing up the keyboard screen during data input, an unregistered keyboard screen number was specified.	2) Create and register keyboard screen or specify the correct keyboard number.
	3) GT configuration data and keyboard screen data exist in the GT, but there is no base screen data.	3) Transfer base screen data from GTWIN.
Screen displays [Memory is Full]	The total capacity of transferred base screen data exceeds the 384 kbyte capacity of the GT. For GT01, the max. capacity is 384 kbytes. For GT11, the max. capacity is 1408 kbytes. For GT21, the max. capacity is 6656 kbytes.	Delete part of the base screen data so that the capacity doesn't exceed the total capacity. Data capacity can be checked by going to [View (V)]→[Memory Usage Conditions] on GTWIN menu bar. When the data capacity is not over the limit, invalid data could possibly be remaining in the GT. When transferring data, do so after deleting the screen.
An unspecified screen appeared/there is trouble when switching screens.	1) The screen specification in the PLC screen setting, the GT switch part or the auto-paging is wrong.	1) Specify the correct screen number.
	2) The startup screen is specified in the GT configuration settings (GTWIN).	2) Check the start-up screen setting for the GT configuration settings in GTWIN. Delete unnecessary settings and re-transfer configuration data.
	3) An erroneous device or value is specified in the first word of the basic communication area word device.	3) Check the device content specified on the PLC side in the first word of the basic communication area. (Do not use the basic communication area with ladder programs.)

Problem	Cause	Solution
Screen doesn't switch	1) No screen number has been written to the screen setting area (the first word in the basic communication area word device) from the PLC.	1) Specify correct screen number.
	2) The screen number to which you are attempting to switch has already been written from the PLC to the screen setting area (the first word in the basic communication area word device.)	2) Refer to GTWIN Manual.
Screen is dim	1) The power voltage may be low.	1) Check the capacity of the power supply unit if it is enough for the GT's power consumption.
	2) The contrast is set too low.	2) Bring up the system menu and adjust the contrast.
	3) The backlight brightness is set too dark.	3) Bring up the system menu and adjust the brightness.
	4) The backlight is off due to the [Backlight Auto-off] setting in the [Setup] of the GT configuration settings in GTWIN.	4) Touching any area of the screen lights that area. If a switch part is set on the touched area, the area will not light even if touched. To change the setting, change the content of the backlight auto-off settings.
Backlight goes off too quickly	1)The backlight auto-off timer setting is too short.	1) Change the backlight auto-off timer setting.
Date/time display is incorrect	1) The PLC's internal calendar timer used as a reference is incorrect.	1) Adjust by rewriting the value in the PLC's internal calendar timer.
Touch panel doesn't work	1) Valid conditions have been set for the switch part, but those conditions have not been met.	1) Check that the device status conditions on the PLC side are valid.
No operating sounds are heard when the touch panel is pressed.	1) The [Switch Sounds] setting under [Options] in the switch part attributes is set to [Disabled].	1) Change the setting to [Enabled].
	2)The [Touch Sounds] setting under [Setup] in the GT configuration settings in GTWIN is set to [Disabled].	2) Change the setting to [Enabled].
Nothing happens for about 10 seconds after turning on power.	Communication conditions of GT (COM port) and PLC differ.	Verify communication settings of GT and PLC and then make them the same.

Problem	Cause	Solution
Buzzer sounds continuously	Bit F of the first word in the basic communication area bit device is set to ON.	Set the F bit to OFF on the PLC side. (Do not use the basic communication area with ladder programs.)
Backlight color changes/ flashes	Bits A and B, and Bit D, of the first word (backlight color setting) in the basic communication area bit device are set to ON. Or, Bits C and D (backlight flashing setting) are set to ON.	Perform correct bit operations on the PLC side. (Do not use the basic communication area with ladder programs.)
Cannot transfer data from GTWIN	1) The screen transfer cable is not connected.	1) Confirm that the screen transfer cable is correctly and firmly connected.
	2) The PC and GT COM port are connected.	2) Connect to TOOL port with screen transfer cable.
	3) The TOOL port of the GT has been set to 230400 bps.	3) Set the baud rate for the GTWIN communication condition to 230400 bps before transfer data.
	4) The network type in the communication settings has been set to either “Ethernet” or “USB”.	4) Set the network type in the communication settings to “RS232C”.
- Screen is blank (power supply and substitution settings noted above do not apply) - An incorrect screen is displayed (error codes and erroneous date and time items noted above do not apply) - Switch doesn’t work (grid and validity settings noted above are correct) - Buzzer sounds continuously	An error has occurred in the GT system.	1) After confirming the safety of the device, etc., turn off the power supply and then turn it on again. The GT CPU will be reset. ⇩ 2) If 1) produces no change, bring up the system menu and initialize the memory (F-ROM), then transfer data again from GTWIN to the GT. NOTE: When doing this, all base screen data, GT setting data, keyboard screen data, and bitmap data will be lose. Before doing this, make sure all data has been backed up. ⇩ 3) If 2) produces no change, set the operating mode setting switches 2, 3 and 4 on the rear of the main unit to ON and reset the power supply. NOTE: When doing this, all of the contents will revert to those in effect at the time of shipping, and all of the GT memory contents will be cleared. Before doing this, make sure all data has been backed up.

7.2 What to DO If Something Unusual Occurs (GT30)

Problem	Cause	Solution
Screen is blank	1) Power is not on.	1) Supply the power supply to unit as per specifications.
	2) (When only lamp and message parts are configured to the base screen) Value of substitute reference device value does not exist in substitute data.	2) Check the address of the substitute reference device and the device values on the PLC side.
Error code [ER**] appears at the top right of the screen	An error has occurred in communication between the GT and an external device (e.g. PLC).	Refer to <7.4 Troubleshooting Error Codes>.
Screen displays [No Screen data]	There is no base screen data in the GT. (Appears even when GT configuration data exists.)	Transfer base screen data from GTWIN.
Screen displays [Screen No. Error]	1) Screen settings from the PLC, the GT30 switch part or the auto-paging indicate an unregistered screen number.	1) Create and register screen content or specify the correct screen number.
	2) When bringing up the keyboard screen during data input, an unregistered keyboard screen number was specified.	2) Create and register keyboard screen or specify the correct keyboard number.
	3) GT configuration data and keyboard screen data exist in the GT, but there is no base screen data.	3) Transfer base screen data from GTWIN.
Screen displays [Memory is Full]	The total capacity of transferred base screen data exceeds capacity of the GT. For GT30M, the max. capacity is 1.5 Mbytes. For GT30C, the max. capacity is 3.25 Mbytes.	Delete part of the base screen data so that the total capacity doesn't exceed the capacity of GT. Data capacity can be checked by going to [View (V)]→[Memory Usage Conditions] on GTWIN menu bar.
An unspecified screen appeared/there is trouble when switching screens.	1) The screen specification in the PLC screen setting, the GT switch part or the auto-paging is wrong.	1) Specify the correct screen number.
	2) The startup screen is specified in the GT configuration settings (GTWIN).	2) Check the start-up screen setting for the GT configuration settings in GTWIN. Delete unnecessary settings and re-transfer configuration data.
	3) An erroneous device or value is specified in the first word of the basic communication area word device.	3) Check the device content specified on the PLC side in the first word of the basic communication area. (Do not use the basic communication area with ladder programs.)

Problem	Cause	Solution
Screen doesn't switch	1) No screen number has been written to the screen setting area (the first word in the basic communication area word device) from the PLC.	1) Specify correct screen number.
	2) The screen number to which you are attempting to switch has already been written from the PLC to the screen setting area (the first word in the basic communication area word device.)	2) Refer to GTWIN Manual.
Screen is dim	1) The power voltage may be low.	1) Supply the power supply to unit as per specifications.
	2) the contrast is set too low.	2) Bring up the system menu and adjust the contrast.
	3) The backlight is off due to the [Backlight Auto-off] setting in the [Setup] of the GT configuration settings in GTWIN.	3) Touching any area of the screen lights that area. If a switch part is set on the touched area, the area will not light even if touched. To change the setting, change the content of the backlight auto-off settings.
Backlight goes off too quickly	1)The backlight auto-off timer setting is too short.	1) Change the backlight auto-off timer setting.
Date/time display is incorrect	1) The GT internal clock is incorrect.	1) Bring up the system menu and adjust the clock.
	2) No battery has been inserted.	2) Open the cover on the option compartment and install a battery.
	3) The battery insulation sheet has not been removed.	3) Open the cover on the option compartment and remove the battery insulation sheet.
	4) The battery has run down.	4) Replace the battery.
	5) The PLC's internal calendar timer used as a reference is incorrect.	5) Adjust by rewriting the value in the PLC's internal calendar timer.
Hold PLC Device data content isn't saved	1) No battery has been inserted.	1) Open the cover on the option compartment and install a battery.
	2) The battery insulation sheet has not been removed.	2) Open the cover on the option compartment and remove the battery insulation sheet.
	3) The battery has run down.	3) Replace the battery.
Touch panel doesn't work	1) The switch part size setting does not match the touch panel grid.	1) When creating screens with GTWIN, match grid settings to touch panel and make them valid, then resize.
	2) Valid conditions have been set for the switch part, but those conditions have not been met.	2) Check that the device status conditions on the PLC side are valid.
No operating sounds are heard when the touch panel is pressed.	1) The [Switch Sounds] setting under [Options] in the switch part attributes is set to [Disabled].	1) Change the setting to [Enabled].
	2) The [Touch Sounds] setting under [Setup] in the GT configuration settings in GTWIN is set to [Disabled].	2) Change the setting to [Enabled].

Problem	Cause	Solution
Buzzer sounds continuously	Bit F of the first word in the basic communication area bit device is set to ON.	Set the F bit to OFF on the PLC side. (Do not use the basic communication area with ladder programs.)
Backlight color flashes	Bits C and D, of the first word (backlight flashing setting) in the basic communication area bit device are set to ON.	Perform correct bit operations on the PLC side. (Do not use the basic communication area with ladder programs.)
Cannot transfer data from GTWIN	1) The screen transfer cable is not connected.	1) Confirm that the screen transfer cable is correctly and firmly connected.
	2) The PC and GTCOM port are connected.	2) Connect to TOOL port with screen transfer cable.
	3) The network type in the communication settings has been set to either “Ethernet” or “USB”.	3) Set the network type in the communication settings to “RS232C”.
- Screen is blank (power supply and substitution settings noted above do not apply) - An incorrect screen is displayed (error codes and erroneous date and time items noted above do not apply) - Switch doesn’t work (grid and validity settings noted above are correct) - Buzzer sounds continuously	An error has occurred in the GT system.	1) After confirming the safety of the device, etc., turn off the power supply and then turn it on again. The GT CPU will be reset. ⇩ 2) If 1) produces no change, bring up the system menu and initialize the memory (F-ROM), then transfer data again from GTWIN to the GT. NOTE: When doing this, all base screen data, GT setting data, keyboard screen data, and bitmap data will be lost. Before doing this, make sure all data has been backed up. ⇩ 3) If 2) produces no change, set the operating mode setting switches 2, 3 and 4 on the GT to ON and reset the power supply. NOTE: When doing this, all of the contents will revert to those in effect at the time of shipping, and all of the GT memory contents will be cleared. Before doing this, make sure all data has been backed up.
Nothing happens for about 10 seconds after turning on power.	Communication conditions of GT (COM port) and PLC differ.	Verify communication settings of GT and PLC and then make them the same.

7.3 What to DO If Something Unusual Occurs (GT05/GT12/ GT32)

Problem	Cause	Solution
Screen is blank	1) Power is not on.	1) Supply the power supply to unit as per specifications.
	2) (When only lamp and message parts are configured to the base screen) Value of substitute reference device value does not exist in substitute data.	2) Check the address of the substitute reference device and the device values on the PLC side.
Error code [ER****] appears at the top right of the screen	An error has occurred in communication between the GT and an external device (e.g. PLC).	Refer to <7.4 Troubleshooting Error Codes>.
Screen displays [No Screen data]	There is no base screen data in the GT. (Appears even when GT configuration data exists.)	Transfer base screen data from GTWIN.
Screen displays [Screen No. Error]	1) Screen settings from the PLC, the GT's switch part or the auto-paging indicate an unregistered screen number.	1) Create and register screen content or specify the correct screen number.
	2) When bringing up the keyboard screen during data input, an unregistered keyboard screen number was specified.	2) Create and register keyboard screen or specify the correct keyboard number.
	3) GT configuration data and keyboard screen data exist in the GT, but there is no base screen data.	3) Transfer base screen data from GTWIN.
	-	4) Press [ESC] button to return to the previous screen.
Screen displays [Memory is Full]	The total capacity of transferred base screen data exceeds the memory capacity of the GT. For the monochrome type, the max. capacity is 2048 kbytes. For the color type, the max. capacity is 12288 kbytes.	Delete part of the base screen data so that the capacity doesn't exceed the total capacity. Data capacity can be checked by going to [View (V)]→[Memory Usage Conditions] on GTWIN menu bar. When the data capacity is not over the limit, invalid data could possibly be remaining in the GT. When transferring data, do so after deleting the screen.
An unspecified screen appeared/there is trouble when switching screens.	1) The screen specification in the PLC screen setting, the GT switch part or the auto-paging is wrong.	1) Specify the correct screen number.
	2) The startup screen is specified in the GT configuration settings (GTWIN).	2) Check the start-up screen setting for the GT configuration settings in GTWIN. Delete unnecessary settings and re-transfer configuration data.
	3) An erroneous device or value is specified in the first word of the basic communication area word device.	3) Check the device content specified on the PLC side in the first word of the basic communication area. (Do not use the basic communication area with ladder programs.)
Screen doesn't switch	1) No screen number has been written to the screen setting area (the first word in the basic communication area word device) from the PLC.	1) Specify correct screen number.
	2) The screen number to which you are attempting to switch has already been written from the PLC to the screen setting area (the first word in the basic communication area word device.)	2) Refer to GTWIN Manual.

Problem	Cause	Solution
Screen is dim	1) The power voltage may be low.	1) Check the capacity of the power supply unit if it is enough for the GT's power consumption.
	2) The contrast is set too low.	2) Bring up the system menu and adjust the contrast.
	3) The backlight is off due to the [Backlight Auto-off] setting in the [Setup] of the GT configuration settings in GTWIN.	3) Touching any area of the screen lights that area. If a switch part is set on the touched area, the area will not light even if touched. To change the setting, change the content of the backlight auto-off settings.
Backlight goes off too quickly	1)The backlight auto-off timer setting is too short.	1) Change the backlight auto-off timer setting.
Date/time display is incorrect (when using the GT's internal clock)	1) The GT's internal clock used as a reference is incorrect.	1) Adjust the clock from the system menu.
	2) No battery has been inserted.	2) Purchase a battery and install it.
	3) The battery has run down.	3) Replace the battery.
Date/time display is incorrect (when using the PLC's internal calender timer)	1) The PLC's internal calendar timer used as a reference is incorrect.	1) Adjust by rewriting the value in the PLC's internal calendar timer.
Hold PLC Device data content isn't saved	1) No battery has been inserted.	1) Purchase a battery and install it.
	2) The battery has run down.	2) Replace the battery.
Date/time display is incorrect	1) The PLC's internal calendar timer used as a reference is incorrect.	1) Adjust by rewriting the value in the PLC's internal calendar timer.
Touch panel doesn't work	1) Valid conditions have been set for the switch part, but those conditions have not been met.	1) Check that the device status conditions on the PLC side are valid.
No operating sounds are heard when the touch panel is pressed.	1) The [Switch Sounds] setting under [Options] in the switch part attributes is set to [Disabled].	1) Change the setting to [Enabled].
	2)The [Touch Sounds] setting under [Setup] in the GT configuration settings in GTWIN is set to [Disabled].	2) Change the setting to [Enabled].
Nothing happens for about 10 seconds after turning on power.	Communication conditions of GT (COM port) and PLC differ.	Verify communication settings of GT and PLC and then make them the same.

Problem	Cause	Solution
Buzzer sounds continuously	Bit F of the first word in the basic communication area bit device is set to ON.	Set the F bit to OFF on the PLC side. (Do not use the basic communication area with ladder programs.)
Backlight color changes/ flashes	Bits A and B, and Bit D, of the first word (backlight color setting) in the basic communication area bit device are set to ON. Or, Bits C and D (backlight flashing setting) are set to ON.	Perform correct bit operations on the PLC side. (Do not use the basic communication area with ladder programs.)
Cannot transfer data from GTWIN	1) The USB or LAN cable (GT32T1) is not connected.	1) Confirm that the screen transfer cable is correctly and firmly connected.
	2) The PC and GT COM. port are connected.	2) Connect the USB cable or LAN cable (GT32T1) correctly.
	3) The network type in the communication settings has been set to “RS232C”.	3) Set the network type in the communication settings to “Ethernet” for using a LAN cable. Set the network type to “USB” for using a USB cable.
- Screen is blank (power supply and substitution settings noted above do not apply) - An incorrect screen is displayed (error codes and erroneous date and time items noted above do not apply) - Switch doesn’t work (grid and validity settings noted above are correct) - Buzzer sounds continuously	An error has occurred in the GT system.	1) After confirming the safety of the device, etc., turn off the power supply and then turn it on again. The GT CPU will be reset. ⇩ 2) If 1) produces no change, bring up the system menu and initialize the memory (F-ROM), then transfer data again from GTWIN to the GT. NOTE: When doing this, all base screen data, GT setting data, keyboard screen data, and bitmap data will be lost. Before doing this, make sure all data has been backed up. ⇩ 3) If 2) produces no change, set the operating mode setting switches 2, 3 and 4 on the rear of the main unit to ON and reset the power supply. NOTE: When doing this, all of the contents will revert to those in effect at the time of shipping, and all of the GT memory contents will be cleared. Before doing this, make sure all data has been backed up.
No sound is output.	1) The speaker is not connected.	1) Connect an audio output equipment (speaker with a built-in ϕ3.5-mini plug amplifier).
	2) The setting for using sound is not on.	2) Set the sound setting of the GTWIN configuration settings to be on.

Operation security function

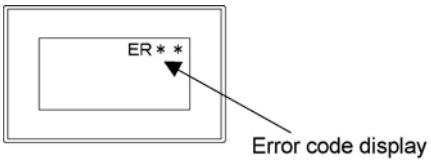
Message	Cause	Solution
“Incorrect password.” Is displayed on the login screen.	An unregistered password was entered.	Enter the registered password.
“Incorrect password.” Is displayed on the password change screen.	An incorrect password was entered in the Current password field.	Enter the registered password correctly.
“Please verify your password again.” Is displayed on the password change screen.	The entered New password and Confirm password are different.	Enter the same password in the New password and Confirm password fields.
“Use another password.” Is displayed on the password change screen.	The password that has been already registered is tried to be registered.	Enter an unregistered new password.
“Password setting incomplete.” Is displayed on the password change screen.	There are items that are not entered.	Enter all items.
“Your password cannot be deleted.” Is displayed on the password management screen.	Your password was tried to be deleted.	Your password cannot be deleted. If you want to delete it, delete from the “Operation security password edit" on GTWIN.
“Your level cannot be changed” is displayed on the password management screen.	Your level was tried to be changed.	Your level cannot be changed. If you wanto to change it, change from the “Operation security password edit” on GTWIN.

 **Reference:** Operation security function <GTWIN Manual ACGM0357V**EN>, <GTWIN HELP>

7.4 Error Codes and How to Handle Them

7.4.1 About Error Codes

When an error occurs in the GT series, an error code displays at the top right of the screen. There are two types of error codes, GT series error codes and PLC error codes.



7.4.2 GT Series Error Codes

The following error codes are displayed when there is an error in the GT.

For GT01, GT11, GT21 and GT30

Code No.	Content	Cause and solution
GTFF	Time up error No response from the PLC.	1) The PLC connection cable is disconnected. Check the connection cable to make sure it is connected. 2) There is a temporary error due to noise, etc. Re-supply power to the PLC and GT.
GT21	Data error A data error occurred during communication.	1) An error exists in the communication condition settings. Check the PLC and GT baud rate and transfer format. 2) There is a temporary error due to noise, etc. Re-supply power to the PLC and GT.
GT22	Overrun error The GT cannot receive data.	The reception buffer in the GT is overflowing. There could be an error in the PLC Re-supply power to the PLC and GT.

For GT05, GT12 and GT32

Code No.	Content	Cause and solution
**00FF	Time up error	1) The PLC connection cable is disconnected. Check the connection cable to make sure it is connected. 2) There is a temporary error due to noise, etc. Re-supply power to the PLC and GT.
**0100	Keyboard screen data parts digit error	Check if the digit of the data parts on the keyboard screen has been set correctly.
**0101	Alarm history error	When updating the alarm history display is stopped, alarm history data displayed on the GT's screen has been updated within the memory. Once the stop of display update is cancelled, new data is displayed.
**0500	Tool setting error	The device that cannot be used is specified for the data. Check if the used device is correct. (e.g. the word device is set in the bit area.)
**1000	SD memory card not inserted	The SD memory card is not inserted to the SD memory card slot properly. Check the SD memory card slot.
**1001	SD memory card writing error	Data cannot be written to the SD memory card. Check whether the SD memory card is not write-protected.
**1002	SD memory card memory full	Data cannot be written as the memory of the SD memory card has been exhausted. Delete some data in the SD memory card or prepare a new SD memory card.
**1003	SD memory card reading error	The data in the SD memory card cannot be read. Check whether the saved data in the SD memory card is not damaged with a PC.
**1005	SD memory card saved file name error	The file name to be saved to the SD memory card from the GT is not specified properly. Specify the file name properly.
**1006	SD memory card recognition error	The SD memory card cannot be recognized. Check the SD memory card used.
**1040	The record area for logging was overwritten.	A SD memory card is not inserted. Check the SD memory card slot.
**1041		Data cannot be written into the SD memory card. Check whether the SD memory card is not write-protected.
**1042		As the memory of the SD memory card has been exhausted. Delete some data in the SD memory card or prepare a new SD memory card.
**1044		The setting to stop writing to SD memory card has been set. Cancel the writing stop setting.
**1043	SD memory card writing error	The setting to stop writing to SD memory card has been set. Cancel the writing stop setting.
**1045	The record area for logging cannot be reserved in the SRAM.	Transfer all data.
**1100	Ethernet IP address setting error	The IP address for Ethernet is not specified correctly. Check the IP address for the GT.
**1101	Ethernet subnet mask setting error	The subnet mask for Ethernet is not specified correctly. Check the subnet mask for the GT.
**1102	Ethernet default gateway setting error	The default gateway for Ethernet is not specified correctly. Check the default gateway for the GT.
**1103	Ethernet port No. setting error	The port No. for Ethernet is not specified correctly. Check the port No. error for the GT.
**2000	Connected GT designation area error The bit corresponding to the connected GT in the connected GT designation area.	The bit in the connected GT designation area corresponding to the station number of the connected GT is not on. Check the connected GT designation area.

Code No.	Content	Cause and solution
**20FF	Token error There is a GT unresponsive to the token.	When the error code is indicated for a certain period of time after the power supply turned on.: 1. The timings for turning on multiple GT units are different. Arrange the wiring that enables the power supplies to be simultaneously turned on. 2. The screen displays for all GT units have not completed. The error code disappears when the screen displays for all GT units have completed. 3. The settings for the startup screen display vary. Make the same setting for all the connected GT units. When the error code is always indicated: 1. There is an unconnected or faulty GT. Check if there is a GT indicating [**20FF]. Reconnect the GT, or turn off the bit in the connected GT designation area. 2. The communication parameters are not specified correctly. Check the baud rate and transmission format for the GT. 3. The same station number is used for more than one GT units. Check the station number setting of the connected GT units. 4. Another GT is reading a SD card. The indication disappears when reading the SD card has completed.
**F000	User's memory error	The memory for saving screen data may be damaged. Please contact us.

7.4.3 When Connected to a FP Series PLC

Error codes which are sent from the PLC are listed in the table below. For details, refer to the table of MEWTOCOL-COM communication errors in PLC user's manuals.

For GT01, GT11, GT21 and GT30

Code No.	Content	Cause and solution
ER21	Data error A data error occurred during communication.	1) There is an error in the communication condition settings. Check the PLC and GT baud rate and transfer format. 2) There is a temporary error due to noise, etc. Re-supply power to the PLC and GT.
ER22	Overrun error The PLC isn't receiving data.	The CPU unit's reception buffer is overflowing. There could be an error in the PLC. Re-supply power to the PLC and GT.
ER40	BCC error A data error occurred during communication.	1) There is a temporary error due to noise, etc. Re-supply power to the PLC and GT. 2) There is an error in the CPU unit. Re-supply power to the PLC and GT.
ER41	Format error The PLC has been sent a command that doesn't match the protocol.	1) There is a temporary error due to noise, etc. Re-supply power to the PLC and GT. 2) There is an error in the CPU unit. Re-supply power to the PLC and GT.
ER42	NOT support error The GT has sent a non-supported command to the PLC.	1) There is a temporary error due to noise, etc. Re-supply power to the PLC and GT. 2) There is an error in the CPU unit. Re-supply power to the PLC and GT.
ER53	BUSY error The PLC is currently processing another command.	A large amount of data is being communicated with another RS232C port on the PLC. Wait until the error is gone.
ER60	Parameter errror	The specified parameter does not exist, or it cannot be used.
ER61	Data run error There is an error in the register or relay number.	A register or relay number which doesn't exist in the PLC was specified during screen creation using GTWIN. Correct the output device being used with the part, or the transfer of clock data to an external device.

For GT05, GT12 and GT32

Code No.	Content	Cause and solution
ER0021	Data error A data error occurred during communication.	1) There is an error in the communication condition settings. Check the PLC and GT baud rate and transfer format. 2) There is a temporary error due to noise, etc. Re-supply power to the PLC and GT.
ER0022	Overrun error The PLC isn't receiving data.	The CPU unit's reception buffer is overflowing. There could be an error in the PLC. Re-supply power to the PLC and GT.
ER0040	BCC error A data error occurred during communication.	1) There is a temporary error due to noise, etc. Re-supply power to the PLC and GT. 2) There is an error in the CPU unit. Re-supply power to the PLC and GT.
ER0041	Format error The PLC has been sent a command that doesn't match the protocol.	1) There is a temporary error due to noise, etc. Re-supply power to the PLC and GT. 2) There is an error in the CPU unit. Re-supply power to the PLC and GT.
ER0042	NOT support error The GT has sent a non-supported command to the PLC.	1) There is a temporary error due to noise, etc. Re-supply power to the PLC and GT. 2) There is an error in the CPU unit. Re-supply power to the PLC and GT.
ER0053	BUSY error The PLC is currently processing another command.	A large amount of data is being communicated with another RS232C port on the PLC. Wait until the error is gone.
ER0060	Parameter errror	The specified parameter does not exist, or it cannot be used.
ER0061	Data run error There is an error in the register or relay number.	A register or relay number which doesn't exist in the PLC was specified during screen creation using GTWIN. Correct the output device being used with the part, or the transfer of clock data to an external device.

7.4.4 When Connected to a PLC (FX Series) Made by Mitsubishi Electric Corporation

For GT01, GT11, GT21 and GT30

Code No.	Content	Cause and solution
ERFF	Time up error There is no response from the PLC.	1) PLC connection cable is disconnected. Check the wiring of the connection cable and check for disconnection. 2) It is a temporary error caused by noise, etc. Turn on the power supplies for PLC or GT again.
ER10	Data error A data error occurred during communication	Check for errors in the communication conditions settings.
ER12	Overrun error The GT cannot receive data.	PLC runaway might be the problem.
ER61	PLC error A NAK error has been returned from the PLC.	Verify the PLC settings.

For GT05, GT12 and GT32

Code No.	Content	Cause and solution
ERFFFE	NAK error A NAK error has been returned from the PLC.	Verify the PLC settings.

7.4.5 When Connected to a PLC Made by Omron Corporation

For GT01, GT11, GT21 and GT30

Code No.	Content	Cause and solution
ER00	Time up error There is no response from the PLC.	1) PLC connection cable is disconnected. Check the wiring of the connection cable and check for disconnection. 2) It is a temporary error caused by noise, etc. Turn on the power supplies for PLC or GT again.
ER01	Cannot be executed due to operation mode. (The PLC received the command that cannot be executed in the operation mode.)	Change the mode of the PLC from the operation mode to the monitor mode.
ER10	Data error A data error occurred during communication	Check for errors in the communication conditions settings.
ER12	Overrun error The GT cannot receive data.	PLC runaway might be the problem.
ER15	Numerical data error Designated read/write area is wrong.	Verify whether or not the reference device used with the basic communication area and each part is a readable and writable area.

- Error codes other than these are based on Omron PLC error codes.
- Be sure to used the PLC in monitor mode. Otherwise, communication will not work properly.

For GT05, GT12 and GT32

Code No.	Content	Cause and solution
ER0001	Cannot be executed due to operation mode. (The PLC received the command that cannot be executed in the operation mode.)	Change the mode of the PLC from the operation mode to the monitor mode.
ER0010	Data error A data error occurred during communication	Check for errors in the communication conditions settings.
ER0012	Overrun error The GT cannot receive data.	PLC runaway might be the problem.
ER0015	Numerical data error Designated read/write area is wrong.	Verify whether or not the reference device used with the basic communication area and each part is a readable and writable area.

- Error codes other than these are based on Omron PLC error codes.
- Be sure to used the PLC in monitor mode. Otherwise, communication will not work properly.

7.4.6 When Connected to Modbus

For GT01, GT11, GT21 and GT30

Code No.	Content	Cause and solution
ERFF	Time up error There is no response from the PLC.	1) PLC connection cable is disconnected. Check the wiring of the connection cable and check for disconnection. 2) It is a temporary error caused by noise, etc. Turn on the power supplies for PLC or GT again.
ERFE	Response error There is an abnormal response returned from the external device.	Check the data to be returned from the external device.

For GT05, GT12 and GT32

Code No.	Content	Cause and solution
**0001	Time up error There is no response from the PLC.	1) PLC connection cable is disconnected. Check the wiring of the connection cable and check for disconnection. 2) It is a temporary error caused by noise, etc. Turn on the power supplies for PLC or GT again.
**ERFE	Response error There is an abnormal response returned from the external device.	Check the data to be returned from the external device.

7.4.7 When Connected to a PLC Made by Toshiba Machine Co., Ltd.

For GT05, GT12 and GT32

Code No.	Content	Cause and solution
ERFFFE	Parameter errror	The specified parameter does not exist, or it cannot be used.

7.4.8 When Performing General-purpose Serial Communication

For GT01, GT11, GT21 and GT30

Error code	Error name	Measures
ER00	BCC error	The value of BCC may be incorrect. Check if there is no calculation mistake.
ER01	Format error	A command format may be incorrect. Check if it is correct.
ER02	NOT supported error	A command used is not supported with the version of the GT. Upgrade the version of the GT, or use another command.
ER03	Address error	The address specified does not exist in the GT. Check the address of the transmitted command.
ER04	Receive buffer overflow	The sent command exceeds the receivable number of bytes. Check the number of bytes of the sent command.
ER05	Requested overflow	The sent readout command exceeds the number of bytes that can send back. Check the number of the read words.
ER06	Data error	The communication condition for the GT may be unmatched with the condition for a destination device. Check the communication conditions.
ER07	Data write inhibit error	A command for the address that writingn is not available was sent. Check the address of the sent command.

For GT05, GT12 and GT32

Error code	Error name	Measures
**0000	BCC error	The value of BCC may be incorrect. Check if there is no calculation mistake.
**0001	Format error	A command format may be incorrect. Check if it is correct.
**0002	NOT supported error	A command used is not supported with the version of the GT. Upgrade the version of the GT, or use another command.
**0003	Address error	The address specified does not exist in the GT. Check the address of the transmitted command.
**0004	Receive buffer overflow	The sent command exceeds the receivable number of bytes. Check the number of bytes of the sent command.
**0005	Requested overflow	The sent readout command exceeds the number of bytes that can send back. Check the number of the read words.
**0006	Data error	The communication condition for the GT may be unmatched with the condition for a destination device. Check the communication conditions.
**0007	Data write inhibit error	A command for the address that writingn is not available was sent. Check the address of the sent command.

Reference: General-purpose serial communication
<GT series General-purpose Serial Communication Manual ARCT1F356E>

Chapter 8

Specifications

8.1 GT01

8.1.1 General Specification

Item	Specifications			
	AIGT0030B AIGT0030H AIGT0130B AIGT0130H AIGT0230B AIGT0230H	**AIGT0032B AIGT0032H AIGT0132B AIGT0132H AIGT0232B AIGT0232H**	**AIGT0030B1 AIGT0030H1 AIGT0130B1 AIGT0130H1 AIGT0230B1 AIGT0230H1**	**AIGT0032B1 AIGT0032H1 AIGT0132B1 AIGT0132H1 AIGT0232B1 AIGT0232H1**
Rated voltage	24 V DC		5 V DC	
Operating voltage range	21.6 to 26.4 V DC		4.5 to 5.5 V DC	
Power consumption	2 W or less (80 mA or less)		1W or less (200 mA or less) *1	1.1 W or less (220 mA or less) *1, *2
Ambient temperature	0 to +50 °C			
Ambient humidity	20 to 85% RH (at 25 °C, non-condensing)			
Storage temperature	-20 to +60 °C			
Storage humidity	10 to 85% RH (at 25 °C, non-condensing)			
Breakdown voltage	Between [power supply terminals] and [case] 500 V AC for 1 minute, Cutoff current 10mA (at default setting)			
Insulation resistance	Between [power supply terminals] and [case] 100 MΩ or more, 500 V DC, measured with megohmmeter (at default setting)			
Vibration resistance	10 to 55 Hz (1-minute cycle) Amplitude: 0.75 mm, 10 min on 3 axes			
Shock resistance	98 m/s^2 or more, 4 times on 3 axes			
EC Directive applicable standard	EMC Directive: EN61000-6-2, EN61000-6-4			Not applicable
Noise immunity	1000 V [P-P] or more, Pulse width 50 ns, 1μs between power supply terminals (based on in-house measurements) *3			
Protective construction	IP65 (in initial status) Dustproof and drip-proof from front panel only (packing used on panel contact surface) *4			
Weight	Approx. 160 g			

*1: When supplying the power from the TOOL port of a PLC (CPU unit), comfirm the PLC restrictions such as the power supply capacity before use.

*2: The power cannot be supplied from the TOOL port of our FP1.

*3: When using our exclusive cable (24 V DC) and the ferrite core attached to the cable (5 V DC).

*4: When reattaching, replace waterproof packing.

8.1.2 Display

Item	Specifications		
	AIGT0030B1/ AIGT0030H1 AIGT0030B/AIGT0030H AIGT0032B1/ AIGT0032H1 AIGT0032B/AIGT0032H	**AIGT0130B1/ AIGT0130H1/ AIGT0130B/ AIGT0130H AIGT0132B1/ AIGT0132H1 AIGT0132B/AIGT0132H**	**AIGT0230B1/ AIGT0230H1 AIGT0230B/AIGT0230H AIGT0232B1/ AIGT0232H1 AIGT0232B/AIGT0232H**
Display device	STN monochrome LCD		
Resolution	128 (W) x 64 (H) dots		
Displayable area	70.38 (W) x 35.18 (H) mm		
Backlight	3-color LED backlight (green, orange, red,)	1-color LED backlight (white)	3-color LED backlight (white, pink, red)
Backlight brightness	Can be set on the menu screen or GTWIN configuration settings. *1		
Contrast	Can be adjusted on the menu screen or GTWIN configuration settings.		

*1: Note that there are some minor variations in the backlight brightness.

8.1.3 Touch Switch

Item	Specifications
Touch switch	Analog touch switch (resistive film type)
Touch switch operation	0.5 N or less
Life	1 million times or more (at 25 °C)

8.1.4 Functions

Item	Specifications
Displayable fonts	Fixed (GTWIN): 1/4 width (8 x 8), half width (16 x 8), full width (16 x 16) (Double or quadruple in height and width) True Type (GTWIN): 10 to 64 dots Windows(R): 10 to 64 dots
Character types	English, Japanese, Korean, German, French, Italian, Spanish, Simplified Chinese, Traditional Chinese characters and Turkish can be displayed.
Number of registerable screens	Approx. 160 screens *1
Registerable screen number	Base screen: No. 0 to 3FF Keyboard screen: No. 0 to 7
Screen types	Base screen (switchable from outside, parts attachable) Keyboard screen (screen allows direct input to data parts)
Graphics	Straight lines, continuous straight lines, squares, circles, ovals, arcs, elliptic arcs, fan shapes, elliptic fan shapes, beveled squares, bitmaps
Part functions	Messages, lamps, switches, data, bar graphs, keyboard, line chart, clock *2
Other functions	Recipe function, Flow display, Write device function, Multi language exchange function
Through function	Connecting a computer to TOOL port and our PLC to COM port enables the communication between the PLC and the computer. (This function is not available for PLCs manufactured by other companies.)
Copy function	The screen data can be copied by connecting the main units with a cable.
GTWIN ver.	Ver2.30 or later

*1: Maximum allowable number varies depending on registered contents.

*2: A clock part can be indicated by referring to external clock data. Clock function is not equipped in GT01.

8.1.5 Memory

Item		Specifications
Base screen data, keyboard screen data, flow display data	Memory type	F-ROM
	Memory capacity	384 kbytes

8.1.6 Communication Interface

Interface for connecting PLC/External devices
- COM port

Item		Specifications		
		AIGT0030B1/AIGT0030H1 AIGT0030B/AIGT0030H AIGT0130B1/AIGT0130H1 AIGT0130B/AIGT0130H AIGT0230B1/AIGT0230H1 AIGT0230B/AIG0230H	AIGT0032B1 AIGT0032H1 AIGT0132B1 AIGT0132H1 AIGT0232B1 AIGT0232H1 5 VDC	AIGT0032B AIGT0032H AIGT0132B AIGT0132H AIGT0232B AIGT0232H 24 VDC
Communication standard		Conforms to RS232C (Non insulation type)	Conforms to RS422 (Non insulation type)	
Communication condition with external devices	Baud rate (bit/s)	9600, 19200, 38400, 57600, 115200 bps		
	Data length (bit)	7, 8		
	Parity	None, Odd, Even		
	Stop bit (bit)	1		
Transmission distance (Total length)		Max. 15 m (Baud rate: 19,200 bit/s)	Max. 30 m (Baud rate: 115,200 bit/s)	Max. 500 m (Baud rate: 115,200 bit/s)
Protocol		- MEWTOCOL (Protocol for PANASONIC PLC: FP series) - General-purpose serial (PANASONIC dedicated protocol) - Other companies' PLC protocols (For the details, refer to the latest GTWIN HELP.)		
Connector		Connector terminal base (8-pin) *1, *2, *3		

*1: The (+) and (-) terminals are the power supply terminals for driving the main unit.
*2: Regarding power supply voltage, please pay due consideration to the cable length so that the applied voltage is within the operation voltage range.
*3: Wen supplying power from a power supply separate from the PLC, make sure the power cable is no longer than 10 m. (5 V DC type only)

Interface for transferring screen data
- TOOL port

Item		Specifications
Communication standard		Conforms to RS232C (Non insulation type)
Conditions for communications with GTWIN	Baud rate (bit/s)	9600, 19200, 115200, 230400 bps *1, *2
	Data length (bit)	8
	Parity	None, Odd, Even
	Stop bit (bit)	1
Protocol		GT dedicated protocol
Connector		Mini-DIN (5-pin)

*1: The baud rate of 230400 bps is available when the USB/RS232C conversion cable is used.
*2: When the baud rate is set to 230400 bps, the connection using the GTWIN automatic communication setting function is not possible. Set the GTWIN communication setting to 230400 bps, and then transfer data.


Reference: For information on connecting and wiring the cables, refer to <Chapter 4 Connecting with PLCs> and <GTWIN HELP>.

8.2 GT05

8.2.1 General Specifications

Item	Specifications	
	GT05S	GT05M/GT05G
Rated voltage	24 V DC	
Operating voltage range	21.6 to 26.4 V DC	
Power consumption	3.6 W or less (150 mA or less)	2.4 W or less (100 mA or less)
Insulation method of power supply part	Transformer insulation	
Ambient temperature	0 to +50 °C	
Ambient humidity	20 to 85% RH (at 25 °C, non-condensing)	
Storage temperature	-20 to +60 °C	
Storage humidity	10 to 85% RH (at 25 °C, non-condensing)	
Breakdown voltage *1	Between [power supply terminals] and [case] 500 V AC for 1 minute, Cutoff current 10mA (at default setting)	
Insulation resistance *1	Between [power supply terminals] and [case] 100 MΩ or more, 500 V DC, measured with megohmmeter (at default setting)	
Vibration resistance	10 to 55 Hz (1-minute cycle) Amplitude: 0.75 mm, 10 min on 3 axes	
Shock resistance	98 m/s^2 or more, 4 times on 3 axes	
EC Directive applicable standard	EMC Directive: EN61131-2	
Noise immunity	1000 V [P-P] or more, Pulse width 50 ns, 1μs between power supply terminals (based on in-house measurements) *2	
Protective construction	IP65 (in initial status) Dustproof and drip-proof from front panel only (packing used on panel contact surface) *3	
Weight	Approx. 230 g	

*1: Not isolated between the USB port, COM. port and the internal digital circuit.
*2: When using our exclusive cable.
*3: When reattaching, replace waterproof packing.

8.2.2 Display

Item	Specifications		
	GT05S	GT05M	GT05G
Display device	4096-color STN color LCD	STN monochrome LCD	
Resolution	320 (W) x 240 (H) dots		
Displayable area	71.02. (W) x 53.26 (H) mm		
Backlight	1-color LED backlight (white)	3-color LED backlight (white, pink, red)	3-color LED backlight (green, orange, red,)
Backlight brightness	Can be set on the menu screen or GTWIN configuration settings. *1		
Contrast	Can be adjusted on the menu screen.		

*1: Note that there are some minor variations in the backlight brightness.

8.2.3 Touch Switch

Item	Specifications
Touch switch	Analog touch switch (resistive film type)
Touch switch operation	0.8 N or less
Life	1 million times or more (at 25 °C)

8.2.4 Functions

Item	Specifications	
	GT05S	GT05M/GT05G
Displayable fonts	Fixed (GTWIN): 1/4 width (8 x 8), half width (16 x 8), full width (16 x 16) (Double, quadruple or octuple in height and width) True Type (GTWIN): 10 to 240 dots Windows(R): 10 to 240 dots	
Character types	English, Japanese, Korean, German, French, Italian, Spanish, Simplified Chinese, Traditional Chinese characters and Turkish can be displayed.	
Number of registerable screens	Approx. 180 screens *1	Approx. 240 screens *1
Registerable screen number	Base screen: No. 0 to 3FF Keyboard screen: No. 0 to 7	
Screen types	Base screen (switchable from outside, parts attachable) Keyboard screen (screen allows direct input to data parts)	
Graphics	Straight lines, continuous straight lines, squares, circles, ovals, arcs, elliptic arcs, fan shapes, elliptic fan shapes, beveled squares, bitmaps	
Part functions	Messages, lamps, switches, data, bar graphs, keyboard, line graphs, alarm list, clock *2, *3	
Other functions	Recipe function, flow display function, write device function, multi language exchange function, alarm list function, alarm history function, operation security function, GT link function	
Through function	Connecting a computer to USB port and our PLC to COM port enables the communication between the PLC and the computer. (This function is not available for PLCs manufactured by other companies.)	
Battery backup *4	Built-in clock data, device hold data, alarm history data (Only when installing a backup battery)	
Battery life *5	Approx. 3 years (at 25 °C)	Approx. 5 years (at 25 °C)
GTWIN ver.	Ver2.90 or later	

*1: Maximum allowable number varies depending on registered contents.
*2: External clock data can be refferred and displayed.
*3: Accuracy of the clock is ±180 seconds per month.
*4: Purchase a battery (product No. AFPX-BATT).
*5: The battery life is the value when no power at all is supplied. The actual lifetime may be decreased according to the condition of use.

8.2.5 Memory

Item		Specifications	
		GT05S	GT05M/GT05G
Base screen data, keyboard screen data, flow display data	Memory type	F-ROM	
	Memory capacity	2048 k bytes	12288 k bytes
Recipe data	Memory type	F-ROM	
	Memory capacity	64 k bytes	
Device writing data	Memory type	F-ROM	
	Memory capacity	64 k bytes	
Device hold area *1	Used memory	SRAM	
	Memory capacity	Device hold area (Max. 24 words)	

*1: As a battery is necessary for SRAM backup, purchase a battery (product No. AFPX-BATT).

8.2.6 External Memory Specifications

SD memory card slot

Item	Specifications
Support media	SD memory card (32MB to 1GB) *1
Supported format standard	Conforms to SD standard *2

*1: The manufacturer name that the operation check has done: Panasonic Corporation

*2: Do not format with the standard format software of a PC.

*3: The SD access lamp turns on while acccessing the SD memory card.

8.2.7 Communication Interface

Interface for connecting PLC/External devices

COM. port

Item		Specifications	
Communication standard		Conforms to RS232C (Non insulation type) *1	Conforms to RS422 (Non insulation type) *1
Communication condition with external devices	Baud rate (bit/s)	9600, 19200, 38400, 57600, 115200 bps	
	Data length (bit)	7, 8	
	Parity	None, Odd, Even	
	Stop bit (bit)	1	
Transmission distance (Total length)		Max. 15 m (Baud rate: 19,200 bit/s)	Max. 500 m (Baud rate: 115,200 bit/s)
Protocol		- MEWTOCOL (Protocol for PANASONIC PLC: FP series) - General-purpose serial (PANASONIC dedicated protocol) - Other companies' PLC protocols (For the details, refer to the latest GTWIN HELP.)	
Connector		Connector terminal base (8-pin) *2, *3	

*1: It is internally isolated from the input power supply side (between +24V and 0V).

*2: The (+) and (-) terminals are the power supply terminals for driving the main unit.

*3: Regarding power supply voltage, please pay due consideration to the cable length so that the applied voltage is within the operation voltage range.

Interface for transferring screen data

- USB port

Item	Specifications
Communication standard	USB1.1
Connector shape *1	TYPE-B
Transmission distance	Max. 5 m
No. of connected unit with PC	1 unit

*1: Take care of handling of the connector not to add an excessive static electricity on the metal part

Reference: For information on connecting and wiring the cables, refer to <Chapter 4 Connecting with PLCs> and <GTWIN HELP>.

8.3 GT11

8.3.1 General Specifications

Item	Specifications
Rated voltage	24 V DC
Operating voltage range	21.6 to 26.4 V DC
Power consumption	2.4 W or less (100 mA or less) *1
Ambient temperature	0 to +50 °C *2
Ambient humidity	20 to 85% RH (at 25 °C, non-condensing)
Storage temperature	-20 to +60 °C
Storage humidity	10 to 85% RH (at 25 °C, non-condensing)
Breakdown voltage	Between [power supply terminals] and [case] 500 V AC for 1 minute, Cutoff current 10mA (at default setting)
Insulation resistance	Between [power supply terminals] and [case] 100 MΩ or more, 500 V DC, measured with megohmmeter (at default setting)
Vibration resistance	10 to 55 Hz (1-minute cycle) Amplitude: 0.75 mm, 10 min on 3 axes
Shock resistance	98 m/s^2 or more, 4 times on 3 axes
EC Directive applicable standard	EMC Directive: EN61000-6-2, EN61000-6-4
Noise immunity	1000 V [P-P] or more, Pulse width 50 ns, 1μs between power supply terminals (based on in-house measurements) *3
Protective construction	IP65 (in initial status) Dustproof and drip-proof from front panel only (packing used on panel contact surface) *4
Weight	Approx. 230 g

*1: When connecting the FP programmer II to the TOOL port, it is 150 mA or less.
*2: When connecting the FP programmer II or C-NET adapter to the TOOL port, the usable range is 0 to +45 °C.
*3: When using our exclusive cable.
*4: When reattaching, replace waterproof packing.

8.3.2 Display

Item	Specifications	
	AIGT2030B/AIGT2030H AIGT2032B/AIGT2032H	AIGT2130B/AIGT2130H AIGT2132B/AIGT2132H
Display device	STN monochrome LCD	
Resolution	240 (W) x 96 (H) dots	
Displayable area	96.0 (W) x 35.4 (H) mm	
Backlight	3-color LED backlight (green, orange, red)	1-color LED backlight (white)
Backlight brightness	Can be set on the menu screen or GTWIN configuration settings. *1	
Contrast	Can be adjusted on the menu screen or GTWIN configuration settings.	

*1: Note that there are some minor variations in the backlight brightness.

8.3.3 Touch Switch

Item	Specifications
Touch switch	Analog touch switch (resistive film type)
Touch switch operation	0.5 N or less
Life	1 million times or more (at 25 °C)

8.3.4 Functions

Item	Specifications
Displayable fonts	Fixed (GTWIN): 1/4 width (8 x 8), half width (16 x 8), full width (16 x 16) (Double or quadruple in height and width) True Type (GTWIN): 10 to 96 dots Windows(R): 10 to 96 dots
Character types	English, Japanese, Korean, German, French, Italian, Spanish, Simplified Chinese, Traditional Chinese characters and Turkish can be displayed.
Number of registerable screens	Approx. 250 screens *1
Registerable screen number	Base screen: No. 0 to 3FF Keyboard screen: No. 0 to 7
Screen types	Base screen (switchable from outside, parts attachable) Keyboard screen (screen allows direct input to data parts)
Graphics	Straight lines, continuous straight lines, squares, circles, ovals, arcs, elliptic arcs, fan shapes, elliptic fan shapes, beveled squares, bitmaps
Part functions	Messages, lamps, switches, data, bar graphs, keyboard, line graphs, alarm list, clock *2, *3
Other functions	Recipe function, flow display function, write device function, multi language exchange function, alarm list function, alarm history function
Through function	Connecting a computer to TOOL port and our PLC to COM port enables the communication between the PLC and the computer. (This function is not available for PLCs manufactured by other companies.)
Battery backup *4	Built-in clock data, device hold data, alarm history data (Only when installing a backup battery)
Battery life *5	Approx. 2 years (at 25 °C)
GTWIN ver.	Ver2.60 or later

*1: Maximum allowable number varies depending on registered contents.
*2: External clock data can be refferred and displayed.
*3: Accuracy of the clock is ±100 seconds per month.
*4: Purchase a commecial battery (CR2032).
*5: The battery life is the value whe no power at all is supplied. The actual lifetime may be decreased according to the condition of use.

8.3.5 Memory

Item		Specifications
Base screen data, keyboard screen data, flow display data	Memory type	F-ROM
	Memory capacity	1.375 Mbytes
Device hold area *1	Used memory	SRAM
	Memory capacity	Device hold area (Max. 24 words)

*1: As a battery is necessary for SRAM backup, purchase a commercial battery (CR2032).

8.3.6 Communication Interface

Interface for connecting PLC/External devices
- COM port

Item		Specifications	
		AIGT2030B/AIGT2030H AIGT2130B/AIGT2130H	AIGT2032B/AIGT2032H AIGT2132B/AIGT2132H
Communication standard		Conforms to RS232C (Non insulation type)	Conforms to RS422 (Non insulation type)
Communication condition with external devices	Baud rate (bit/s)	9600, 19200, 38400, 57600, 115200 bps	
	Data length (bit)	7, 8	
	Parity	None, Odd, Even	
	Stop bit (bit)	1	
Transmission distance (Total length)		Max. 15 m (Baud rate: 19,200 bit/s)	Max. 500 m (Baud rate: 115,200 bit/s)
Protocol		- MEWTOCOL (Protocol for PANASONIC PLC: FP series) - General-purpose serial (PANASONIC dedicated protocol) - Other companies' PLC protocols (For the details, refer to the latest GTWIN HELP.)	
Connector		Connector terminal base (8-pin) *1, *2	

*1: The (+) and (-) terminals are the power supply terminals for driving the main unit.
*2: Regarding power supply voltage, please pay due consideration to the cable length so that the applied voltage is within the operation voltage range.

Interface for transferring screen data
- TOOL port

Item		Specifications
Communication standard		Conforms to RS232C (Non insulation type)
Conditions for communications with GTWIN	Baud rate (bit/s)	9600, 19200, 115200, 230400 bps *1, *2
	Data length (bit)	8
	Parity	None, Odd, Even
	Stop bit (bit)	1
Protocol		GT dedicated protocol
Connector		Mini-DIN (5-pin)

*1: The baud rate of 230400 bps is available when the USB/RS232C conversion cable is used.
*2: When the baud rate is set to 230400 bps, the connection using the GTWIN automatic communication setting function is not possible. Set the GTWIN communication setting to 230400 bps, and then transfer data.


Reference: For information on connecting and wiring the cables, refer to <Chapter 4 Connecting with PLCs> and <GTWIN HELP>.

8.4 GT12

8.4.1 General Specifications

Item	Specifications
Rated voltage	24 V DC
Operating voltage range	21.6 to 26.4 V DC
Power consumption	1.7 W or less (70 mA or less)
Insulation method of power supply part	Transformer insulation *1
Ambient temperature	0 to +50 C
Ambient humidity	20 to 85% RH (at 25 C, non-condensing)
Storage temperature	-20 to +60 C
Storage humidity	10 to 85% RH (at 25 C, non-condensing)
Breakdown voltage *1	Between [power supply terminals (+ and – terminals)] and [function earth terminal] 500 V AC for 1 minute, Cutoff current 10mA (in initial status)
Insulation resistance *1	Between [power supply terminals (+ and – terminals)] and [function earth terminal] 100 MΩ or more, 500 V DC, measured with megohmmeter (in initial status)
Vibration resistance	5 to 9 Hz amplitude 3.5 mm, 9 to 150 Hz acceleration 9.8 m/s^2, 10 sweeps each in X, Y and Z directions (1 octave/min)
Shock resistance	147 m/s^2, 3 times on 3 axes
EC Directive applicable standard	EN61131-2
Noise immunity	1000 V [P-P] or more, Pulse width 50 ns, 1μs between power supply terminals (based on in-house measurements) *2
Protective construction	IP67 (in initial status) Dustproof and waterproof from front panel only (packing used on panel contact surface) *3
Weight	Approx. 240 g

*1 Not isolated between the USB port, COM. port and the internal digital circuit.

*2 When using our exclusive cable.

*3 When installing the unit again, replace the water-proof packing.

8.4.2 Display Unit

Item	Specifications	
	GT12M1	GT12G1
Display	STN monochrome LCD	
Resolution	320 (W) x 120 (H) dots	
Displayable area	108.78 (W) x 40.78 (H) mm	
Gradation	2 gradation/8 gradation (Selectable with GTWIN.)	
Backlight	3-color LED bakclight (white, red, pink)	3-color LED backlight (green, red, orange)
Backlight brightness setting	Backlight brightness can be adjusted on the menu screen or GTWIN configuration settings.	
Contrast adjustment	Contrast can be adjusted on the menu screen.	

Note) Note that there are some minor variations in the backlight brightness.

8.4.3 Touch Switch

Item	Specifications
Touch switch resolution	Analog-type resistance
Touch switch operating force	Max. 0.8 N
Touch switch life	More than 1 million times (at 25 °C)

8.4.4 Functions

Item	Specifications
Character size	・Fixed (GTWIN) 1/4 width, half width, full size characters (Same-, double-, quadruple- and octuple-width vertical and horizontal display possible) ・True Type (GTWIN): 10 to 240 dots ・Windows (R): 10 to 240 dots
Characters	English, Japanese, Korean, Germany, French, Italian, Spanish Simplified Chinese, Traditional Chinese, and Turkish.
Number of screens	2 gradation:250 screens 8 gradation:200screens *1
Addressable screen number	Base screen No. 0 to 3FF Keyboard screen No. 0 to 7
Screen types	Base screen (switchable from outside, parts attachable) Keyboard screen (screen allows direct input to data parts)
Displayable graphics	Straight lines, continuous straight lines, squares, circles, ellipses, circular arcs, elliptical circular arcs, fan shapes, elliptical fan shapes, beveled squares, bitmap
Part type	Lamp, message, switch, data, keyboard, bar graph, line graph, alarm list, clock *2 *3
Other functions	Recipe function, Flow display function, Write device function, Multi language exchange function, Alarm list function
Through function	PLC can be communicated with personal computer by connecting computer to USB port and PLC to COM. port. (This function is not available for PLCs manufactured by other companies.)
Battery backup *4	Built-in clock data, device hold data, alarm history data (Only when installing a backup battery)
Battery life *5	Approx. 5 years (at 25 °C)
GTWIN Ver.	Ver. 2.97 or later

*1: Maximum allowable number varies depending on registered contents.
*2: External clock data can be refferred and displayed.
*3: Accuracy of the clock is ±180 seconds per month.
*4: Purchase a battery (product No. AFPX-BATT).
*5: The battery life is the value when no power at all is supplied.
The actual lifetime may be decreased according to the condition of use.

8.4.5 Memory

Item		Specifications
Base screen data, keyboard screen data, flow display data	Usable memory	F-ROM
	Memory capacity	12288kbytes
Recipe data	Usable memory	F-ROM
	Memory capacity	64kbytes
Write device data	Usable memory	F-ROM
	Memory capacity	64kbytes
Device hold area *1	Usable memory	SRAM
	Memory capacity	Device hold area (Max. 24 words)

*1 The SRAM is backed up with a battery. Please purchase a battery (Product No.: AFPX-BATT) separately.

8.4.6 External Memory

SD memory card slot

Item	Specifications
Support media	SD memory card (32MB to 1GB) *1
Supported format standard	Conforms to SD standard *2

*1: The manufacturer name that the operation check has done: Panasonic
*2: Do not format with the standard format software of a PC.
*3: The SD access lamp turns on while accessing the SD memory card.

8.4.7 Communication Interface

Interface for connecting PLC and External devices
COM port

Item		Specifications	
		RS232C type	RS422/RS485 type
Communication standard		Conforms to RS232C (Non insulation type) *1	Conforms to RS422 (Non insulation type) *1
Communication condition with external devices	Baud rate (bit/s)	9600, 19200, 38400, 57600, 115200 bps	
	Data length (bit)	7, 8	
	Parity	None, Odd, Even	
	Stop bit (bit)	1	
Transmission distance (Total length)		Max. 15 m (Baud rate: 19,200 bit/s)	Max. 500 m (Baud rate: 115,200 bit/s)
Protocol		MEWTOCOL (Protocol for PANASONIC PLC: FP series) General-purpose serial (PANASONIC dedicated protocol) Other companies' PLC protocols (For the details, refer to the latest GTWIN HELP.)	
Connector		Connector terminal base (8-pin) *2, *3	

*1: It is internally isolated from the input power supply side (between +24V and 0V).
*2: The (+) and (-) terminals are the power supply terminals for driving the main unit.
*3: Regarding power supply voltage, please pay due consideration to the cable length so that the applied voltage is within the operation voltage range.

8.4.8 Interface for transferring screen data

USB port

Item	Specifications
Interface standard	USB1.1
Connector shape *1	USB MiniB type 5pin (Male)
Transmission distance	Max. 5 m
No. of connected unit with PC	1 unit

*1 Take care of handling of the connector not to add an excessive static electricity on the metal part of the connector.

8.5 GT21

8.5.1 General Specifications

Item	Specifications
Rated voltage	24 V DC
Operating voltage range	21.6 to 26.4 V DC
Power consumption	4.8 W or less (200 mA or less)
Ambient temperature	0 to +50 °C *1
Ambient humidity	20 to 85% RH (at 25 °C, non-condensing)
Storage temperature	-20 to +60 °C
Storage humidity	10 to 85% RH (at 25 °C, non-condensing)
Breakdown voltage	Between [power supply terminals] and [case] 500 V AC for 1 minute, Cutoff current 10mA (at default setting)
Insulation resistance	Between [power supply terminals] and [case] 100 MΩ or more, 500 V DC, measured with megohmmeter (at default setting)
Vibration resistance	10 to 55 Hz (1-minute cycle) Amplitude: 0.75 mm, 10 min on 3 axes
Shock resistance	98 m/s^2 or more, 4 times on 3 axes
EC Directive applicable standard	EMC Directive: EN61000-6-2, EN61000-6-4
Noise immunity	1000 V [P-P] or more, Pulse width 50 ns, 1μs between power supply terminals (based on in-house measurements) *2
Protective construction	IP65 (in initial status) Dustproof and drip-proof from front panel only (packing used on panel contact surface) *3
Weight	Approx. 230 g

*1: When it is installed in a horizontal orientation (installed to make the liquid crystal face be topside) or when the FP programmer II or C-NET adapter is connected to the TOOL port, the usable range is 0 to +45 °C.

*2: When using our exclusive cable.

*3: When reattaching, replace waterproof packing.

8.5.2 Display

Item	Specifications
Display device	256-color STN color LCD
Resolution	320 (W) x 240 (H) dots
Displayable area	98.0 (W) x 74.0 (H) mm
Backlight	1-color LED backlight (white)
Backlight brightness	Can be set on the menu screen or GTWIN configuration settings. *1
Contrast	Can be adjusted on the menu screen or GTWIN configuration settings.

*1: Note that there are some minor variations in the backlight brightness.

8.5.3 Touch Switch

Item	Specifications
Touch switch	Analog touch switch (resistive film type)
Touch switch operation	0.8 N or less
Life	1 million times or more (at 25 °C)

8.5.4 Functions

Item	Specifications
Displayable fonts	Fixed (GTWIN): 1/4 width (8 x 8), half width (16 x 8), full width (16 x 16) (Double or quadruple in height and width) True Type (GTWIN): 10 to 96 dots Windows(R): 10 to 96 dots
Character types	English, Japanese, Korean, German, French, Italian, Spanish, Simplified Chinese, Traditional Chinese characters and Turkish can be displayed.
Number of registerable screens	Approx. 250 screens *1
Registerable screen number	Base screen: No. 0 to 3FF Keyboard screen: No. 0 to 7
Screen types	Base screen (switchable from outside, parts attachable) Keyboard screen (screen allows direct input to data parts)
Graphics	Straight lines, continuous straight lines, squares, circles, ovals, arcs, elliptic arcs, fan shapes, elliptic fan shapes, beveled squares, bitmaps
Part functions	Messages, lamps, switches, data, bar graphs, keyboard, line graphs, alarm list, clock *2, *3
Other functions	Recipe function, flow display function, write device function, multi language exchange function, alarm list function, alarm history function
Through function	Connecting a computer to TOOL port and our PLC to COM port enables the communication between the PLC and the computer. (This function is not available for PLCs manufactured by other companies.)
Battery backup *4	Built-in clock data, device hold data, alarm history data (Only when installing a backup battery)
Battery life *5	Approx. 2 years (at 25 °C)
GTWIN ver.	Ver2.70 or later

*1: Maximum allowable number varies depending on registered contents.
*2: External clock data can be refferred and displayed.
*3: Accuracy of the clock is ±180 seconds per month.
*4: Purchase a commecial battery (CR2032).
*5: The battery life is the value when no power at all is supplied. The actual lifetime may be decreased according to the condition of use.

8.5.5 Memory

Item		Specifications
Base screen data, keyboard screen data, flow display data	Memory type	F-ROM
	Memory capacity	6.5 Mbytes
Device hold area *1	Used memory	SRAM
	Memory capacity	Device hold area (Max. 24 words)

*1: As a battery is necessary for SRAM backup, purchase a commercial battery (CR2032).

8.5.6 Communication Interface

Interface for connecting PLC/External devices
- COM port

Item		Specifications	
		AIGT2230B/AIGT2230H	AIGT2232B/AIGT2232H
Communication standard		Conforms to RS232C (Non insulation type)	Conforms to RS422 (Non insulation type)
Communication condition with external devices	Baud rate (bit/s)	9600, 19200, 38400, 57600, 115200 bps	
	Data length (bit)	7, 8	
	Parity	None, Odd, Even	
	Stop bit (bit)	1	
Transmission distance (Total length)		Max. 15 m (Baud rate: 19,200 bit/s)	Max. 500 m (Baud rate: 115,200 bit/s)
Protocol		- MEWTOCOL (Protocol for PANASONIC PLC: FP series) - General-purpose serial (PANASONIC dedicated protocol) - Other companies' PLC protocols (For the details, refer to the latest GTWIN HELP.)	
Connector		Connector terminal base (8-pin) *1, *2	

*1: The (+) and (-) terminals are the power supply terminals for driving the main unit.
*2: Regarding power supply voltage, please pay due consideration to the cable length so that the applied voltage is within the operation voltage range.

Interface for transferring screen data
- TOOL port

Item		Specifications
Communication standard		Conforms to RS232C (Non insulation type)
Conditions for communications with GTWIN	Baud rate (bit/s)	9600, 19200, 115200, 230400 bps *1, *2
	Data length (bit)	8
	Parity	None, Odd, Even
	Stop bit (bit)	1
Protocol		GT dedicated protocol
Connector		Mini-DIN (5-pin)

*1: The baud rate of 230400 bps is available when the USB/RS232C conversion cable is used.
*2: When the baud rate is set to 230400 bps, the connection using the GTWIN automatic communication setting function is not possible. Set the GTWIN communication setting to 230400 bps, and then transfer data.

 **Reference:** For information on connecting and wiring the cables, refer to <Chapter 4 Connecting with PLCs> and <GTWIN HELP>.

8.6 GT30

8.6.1 General Specifications

Item	Specifications
Rated voltage	24 V DC
Operating voltage range	21.6 to 26.4 V DC
Power consumption	10 W or less
Ambient temperature	0 to +50 °C *1
Ambient humidity	20 to 85% RH (at 25 °C, non-condensing)
Storage temperature	-20 to +60 °C
Storage humidity	10 to 85% RH (at 25 °C, non-condensing)
Breakdown voltage	Between [power supply terminals] and [case] 500 V AC for 1 minute, Cutoff current 10mA (at default setting)
Insulation resistance	Between [power supply terminals] and [case] 100 MΩ or more, 500 V DC, measured with megohmmeter (at default setting)
Vibration resistance	10 to 55 Hz (1-minute cycle) Amplitude: 0.75 mm, 10 min on 3 axes
Shock resistance	98 m/s^2 or more, 4 times on 3 axes
EC Directive applicable standard	EMC Directive: EN61000-6-2, EN61000-6-4
Noise immunity	1000 V [P-P] or more, Pulse width 50 ns, 1μs between power supply terminals (based on in-house measurements) *2
Static noise resistance	5,000 V or more (panel surface)
Protective construction	IP65 (in initial status) Dustproof and drip-proof from front panel only (packing used on panel contact surface) *3
Weight	Approx. 440 g

*1: When it is installed in a horizontal orientation (installed to make the liquid crystal face be topside) or when the FP programmer II or C-NET adapter is connected to the TOOL port, the usable range is 0 to +40 °C.

*2: When using our exclusive cable.

*3: When reattaching, replace waterproof packing.

8.6.2 Display

Item	Specifications	
	AIGT3100B/AIGT3100H	AIGT3300B/AIGT3300H
Display device	STN monochrome LCD	STN color LCD
Resolution	320 (W) x 240 (H) dots	
Displayable area	118.18 (W) x 89.38 (H) mm	
Display color	2 colors (blue/white)	16 colors
Backlight	CFL backlight (Repalceable)	
LCD life	Average 50,000 hours (at 25 °C room temperature)	
Contrast	Can be adjusted on the menu screen.	

8.6.3 Touch Switch

Item	Specifications
Touch switch	Matrix system, Division number: 16(W) x 12 (H)
Touch switch operation	0.98 N or less
Life	1 million times or more

8.6.4 Functions

Item	Specifications	
	AIGT3100B/AIGT3100H	AIGT3300B/AIGT3300H
Displayable fonts	Fixed (GTWIN): 1/4 width (8 x 8), half width (16 x 8), full width (16 x 16) (Double, quadruple or octuple in height and width) True Type (GTWIN): 10 to 240 dots Windows(R): 10 to 240 dots	
Character types	English, Japanese, Korean, German, French, Italian, Spanish, Simplified Chinese, Traditional Chinese characters and Turkish can be displayed.	
Number of registerable screens	Approx. 220 screens *1	Approx. 160 screens *1
Registerable screen number	Base screen: No. 0 to 3FF Keyboard screen: No. 0 to 7	
Screen types	Base screen (switchable from outside, parts attachable) Keyboard screen (screen allows direct input to data parts)	
Graphics	Straight lines, continuous straight lines, squares, circles, ovals, arcs, elliptic arcs, fan shapes, elliptic fan shapes, beveled squares, bitmaps	
Part functions	Messages, lamps, switches, data, bar graphs, keyboard, line graphs, alarm list, clock *2, *3	
Other functions	Recipe function, flow display function, write device function, alarm list function, alarm history function	
Through function	Connecting a computer to USB port and our PLC to COM port enables the communication between the PLC and the computer. (This function is not available for PLCs manufactured by other companies.)	
Battery backup *4	Built-in clock data, device hold data, alarm history data (Only when installing a backup battery)	
Battery life *5	Approx. 2 years (at 25 °C)	
GTWIN ver.	Ver2.60 or later	

*1: Maximum allowable number varies depending on registered contents.

*2: External clock data can be refferred and displayed.

*3: Accuracy of the clock is ±100 seconds per month.

*4: The battery life is the value whe no power at all is supplied. The actual lifetime may be decreased according to the condition of use.

8.6.5 Memory

Item		Specifications	
		AIGT3100B/AIGT3100H	AIGT3300B/AIGT3300H
Base screen data, keyboard screen data, flow display data	Memory type	F-ROM	
	Memory capacity	1.5 Mbytes	3.25 Mbytes
Device hold area *1	Used memory	SRAM	
	Memory capacity	Device hold area (Max. 24 words)	

*1: A battery is necessary for SRAM backup.

8.6.6 Communication Interface

Interface for connecting PLC/External devices
- COM port

Item		Specifications
Communication standard		Conforms to RS232C (Non insulation type)
Communication condition with external devices	Baud rate (bit/s)	9600, 19200, 38400, 57600, 115200 bps
	Data length (bit)	7, 8
	Parity	None, Odd, Even
	Stop bit (bit)	1
Transmission distance (Total length)		Max. 15 m (Baud rate: 19,200 bit/s)
Protocol		- MEWTOCOL (Protocol for PANASONIC PLC: FP series) - General-purpose serial (PANASONIC dedicated protocol) - Other companies' PLC protocols (For the details, refer to the latest GTWIN HELP.)
Connector		Connector terminal base (8-pin) *1

*1: The (+) and (-) terminals are the power supply terminals for driving the main unit.
*2: Regarding power supply voltage, please pay due consideration to the cable length so that the applied voltage is within the operation voltage range.

Interface for transferring screen data
- TOOL port

Item		Specifications
Communication standard		Conforms to RS232C (Non insulation type)
Conditions for communications with GTWIN	Baud rate (bit/s)	9600, 19200, 115200
	Data length (bit)	8
	Parity	None, Odd, Even
	Stop bit (bit)	1
Protocol		GT dedicated protocol
Connector		Mini-DIN (5-pin)

Reference: For information on connecting and wiring the cables, refer to <Chapter 4 Connecting with PLCs> and <GTWIN HELP>.

8.7 GT32

8.7.1 General Specifications

Item	Specifications		
	GT32M	GT32T0	GT32T1
Rated voltage	24 V DC		
Operating voltage range	21.6 to 26.4 V DC		
Power consumption	10 W or less (410 mA or less)		12 W or less (500 mA or less)
Insulation method of power supply part	Transformer insulation		
Ambient temperature	0 to +50 °C *1		
Ambient humidity	20 to 85% RH (at 25 °C, non-condensing)		
Storage temperature	-20 to +60 °C		
Storage humidity	10 to 85% RH (at 25 °C, non-condensing)		
Breakdown voltage *2	Between [power supply terminals] and [case] 500 V AC for 1 minute, Cutoff current 10mA (at default setting)		
Insulation resistance *2	Between [power supply terminals] and [case] 100 MΩ or more, 500 V DC, measured with megohmmeter (at default setting)		
Vibration resistance	10 to 55 Hz (1-minute cycle), Amplitude: 0.75 mm, 10 min on 3 axes		
Shock resistance	98 m/s^2, 4 times on 3 axes		
EC Directive applicable standard	EMC Directive: EN61131-2		
Noise immunity	1000 V [P-P] or more, Pulse width 50 ns, 1μs between power supply terminals (based on in-house measurements) *3		
Protective construction	IP65 (in initial status) Dustproof and drip-proof from front panel only (packing used on panel contact surface) *4		
Weight	Approx. 500 g	Approx. 470 g	Approx. 480 g

*1: When it is installed in a horizontal orientation (installed to make the liquid crystal face be topside), the usable range is 0 to +40 °C.
*2: Not isolated between the USB port, COM port, Ethernet port (GT32T1 only) and the internal digital circuit.
*3: When using our exclusive cable.
*4: When reattaching, replace waterproof packing.

8.7.2 Display

Item	Specifications	
	GT32M	GT32T0/GT32T1
Display device	Blue-white STN monochrome LCD	4096-color TFT color LCD
Resolution	320 (W) x 240 (H) dots	
Displayable area	113.2 (W) x 86.4 (H) mm	110.8 (W) x 83.6 (H) mm
Backlight	CFL backlight (Repalceable)	
LCD life	75000 hours (at 25 °C) *1	50000 hours (at 25 °C) *1
Contrast	Can be adjusted on the menu screen.	None

*1: The backlight life varries depending on the usage environment such as temperature, humidity or operating voltage. Especially, if it is used at low temperatures, the life will be extremely short.

8.7.3 Touch Switch

Item	Specifications
Touch switch	Analog touch switch (resistive film type)
Touch switch operation	0.8 N or less
Life	1 million times or more (at 25 °C)

8.7.4 Functions

Item	Specifications	
	GT32M	GT32T0/GT32T1
Displayable fonts	Fixed (GTWIN): 1/4 width (8 x 8), half width (16 x 8), full width (16 x 16) (Double, quadruple or octuple in height and width) True Type (GTWIN): 10 to 240 dots Windows(R): 10 to 240 dots	
Character types	English, Japanese, Korean, German, French, Italian, Spanish, Simplified Chinese, Traditional Chinese characters and Turkish can be displayed.	
Number of registerable screens	Approx. 240 screens *1	Approx. 180 screens *1
Registerable screen number	Base screen: No. 0 to 3FF Keyboard screen: No. 0 to 7	
Screen types	Base screen (switchable from outside, parts attachable) Keyboard screen (screen allows direct input to data parts)	
Graphics	Straight lines, continuous straight lines, squares, circles, ovals, arcs, elliptic arcs, fan shapes, elliptic fan shapes, beveled squares, bitmaps	
Part functions	Messages, lamps, switches, data, bar graphs, keyboard, line graphs, alarm list, clock *2, *3, *4, *5	
Other functions	Recipe function, flow display function, write device function, multi language exchange function, alarm list function, alarm history function, sound output function *6, operation security function, GT link function	
Through function	Connecting a computer to Ethernet port or USB port and our PLC to COM port enables the communication between the PLC and the computer. (This function is not available for PLCs manufactured by other companies.) *7	
Battery backup *3	Built-in clock data, device hold data, alarm history data (Only when installing a backup battery)	
Battery life *4	Approx. 5 years (at 25 °C)	Approx. 3 years (at 25 °C)
GTWIN Ver.	Ver2.80 or later	

*1: Maximum allowable number varies depending on registered contents.
*2: External clock data can be refferred and displayed.
*3: Purchase a battery separately.
*4: The battery life is the value when no power at all is supplied. The actual lifetime may be shorter according to the condition of use.
*5: Accuracy of the clock is ±180 seconds per month.
*6: The sound output function is available for GT32T1 only.
*7: The Ethernet port is available for GT32T1 only.

8.7.5 Memory

Item		Specifications	
		GT32M	GT32T0/GT32T1
Base screen data, keyboard screen data, flow display data, sound data *1	Memory type	F-ROM	
	Memory capacity	2048 k bytes	12288 k bytes
Recipe data	Memory type	F-ROM	
	Memory capacity	64 k bytes	
Device writing data	Memory type	F-ROM	
	Memory capacity	64 k bytes	
Device hold area *1	Used memory	SRAM	
	Memory capacity	Device hold area (Max. 24 words)	

*1: Sound data is available for GT32T1 only.
*2: As a battery is necessary for SRAM backup, purchase a battery (product No. AFPX-BATT).

8.7.6 External Memory Specifications

SD memory card slot

Item	Specifications
Support media	SD memory card (32MB to 1GB) *1
Supported format standard	Conforms to SD standard *2

Note1) The manufacturer name that the operation check has done: Panasonic Corporation
Note2) Do not format with the standard format software of a PC.
Note3) The SD access lamp turns on while acccessing the SD memory card.

8.7.7 Communication Interface

Interface for connecting PLC/External devices
COM. port

Item		Specifications	
		AIG32MQ02D/AIG32MQ03D AIG32TQ02D/AIG32TQ03D AIG32TQ12D/AIG32TQ13D	AIG32MQ04D/AIG32MQ05D AIG32TQ04D/AIG32TQ05D AIG32TQ14D/AIG32TQ15D
Communication standard		Conforms to RS232C (Non insulation type) *1	Conforms to RS422 (Non insulation type) *1
Communication condition with external devices	Baud rate (bit/s)	9600, 19200, 38400, 57600, 115200 bps	
	Data length (bit)	7, 8	
	Parity	None, Odd, Even	
	Stop bit (bit)	1	
Transmission distance (Total length)		Max. 15 m (Baud rate: 19,200 bit/s)	Max. 500 m (Baud rate: 115,200 bit/s)
Protocol		- MEWTOCOL (Protocol for PANASONIC PLC: FP series) - General-purpose serial (PANASONIC dedicated protocol) - Other companies' PLC protocols (For the details, refer to the latest GTWIN HELP.)	
Connector		Connector terminal base (8-pin) *2, *3	

*1: It is internally isolated from the input power supply side (between +24V and 0V).
*2: The (+) and (-) terminals are the power supply terminals for driving the main unit.
*3: Regarding power supply voltage, please pay due consideration to the cable length so that the applied voltage is within the operation voltage range.

Reference: For information on connecting and wiring the cables, refer to <Chapter 4 Connecting with PLCs> and <GTWIN HELP>.

Interface for transferring screen data

- USB port

Item	Specifications
Communication standard	USB1.1
Connector shape *1	TYPE-B
Transmission distance	Max. 5 m
No. of connected unit with PC	1 unit

*1: Take care of handling of the connector not to add an excessive static electricity on the metal part

*2: Screens can be transferred in one third less time via the Ethernet port. (The speed varies depending on screen contents.)

Ethernet port (GT32T1 only)

Item	Specifications
	GT32T1
Communication standard	IEEE802.8u/100BASE-TX IEEE802.3/10BASE-T *1
Connector shape	Plug-in phone jack *2
Transmission distance	Max. 100 m
Applicable cable	UTP cable (Unshielded wire) Category 5 *3
Auto MDI-X	Supported
SPEED lamp	Light on: During 100BASE-TX communication Blinking: During 10BASE-TX communication
LINK/ACT lamp	Light on: When linked Blinking: During data reception.

*1: Data processing in the main unit is carried out with the serial communication of 115.2 kbps.

*2: Take care of handling of the connector not to add an excessive static electricy on the metal part of the connector.

*3: Do not use a STP cable (shielded wire).

*4: Ethernet is a trademark of Zerox Corporation, USA.

*5: Simultaneous communication with the USB port is not achievable.

8.7.8 Sound Output Specifications (GT32T1 Only)

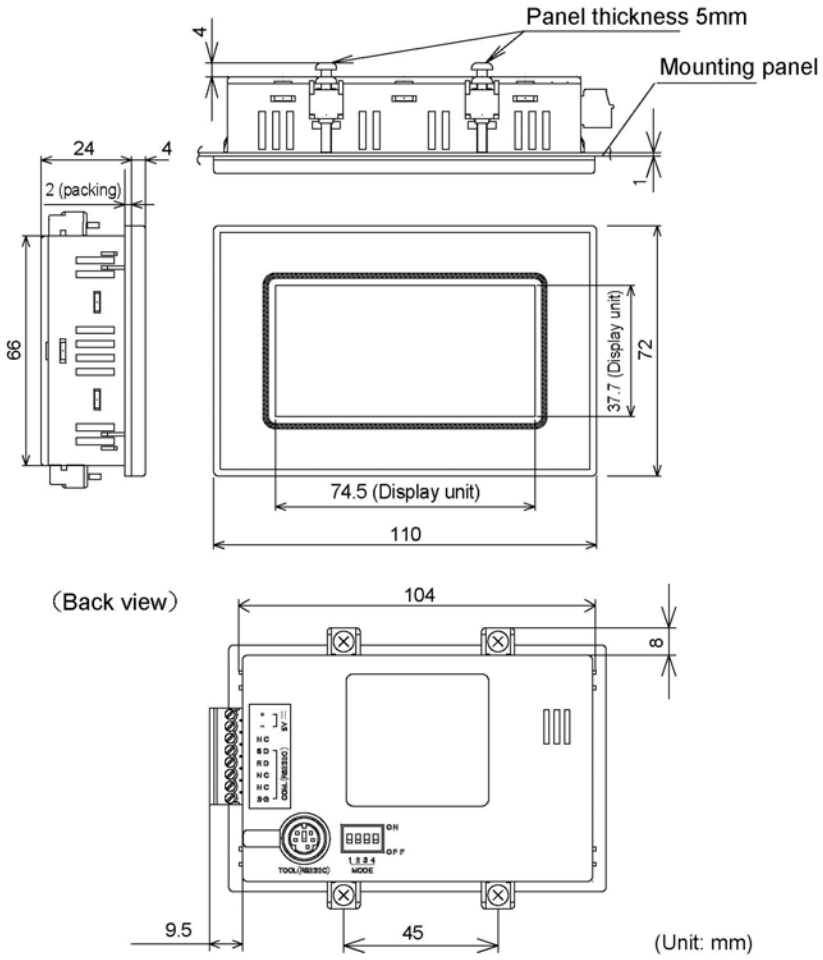
Item	Specifications
	GT32T1
File format	WAV format (PCM format, sampling 8 KHz, 16 bits monoral)
Max. sound data capacity	512 kbytes (Approx. 30 seconds)
Max. registered No. of sound data	128
Sound output voltage	2 Vp-p
Output terminal	ϕ3.5 stereo mini jack
Connecting amplifier	Input impedance 10 kΩ or more

Chapter 9

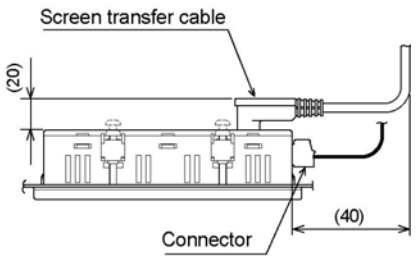
Dimensions and Other Documentation

9.1 Dimensions

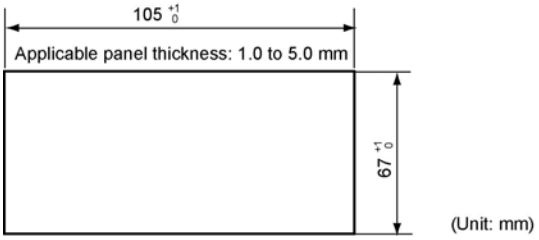
9.1.1 GT01/GT01R



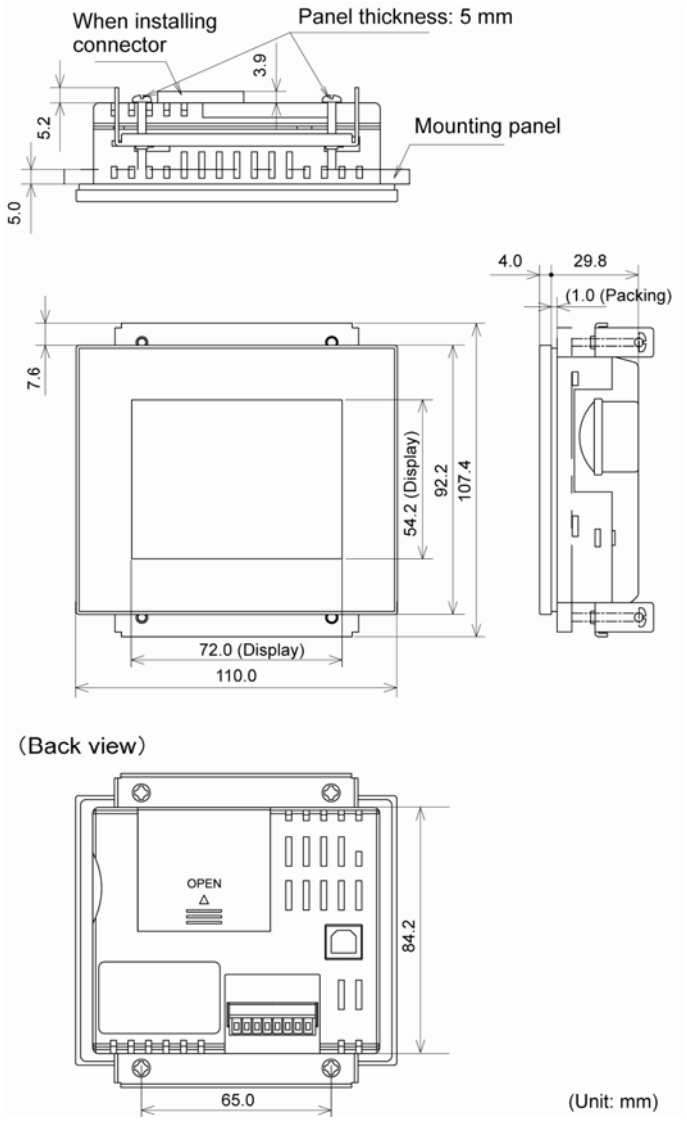
When installing cables



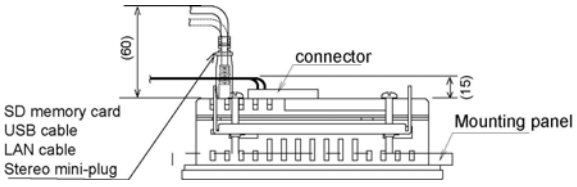
Panel cutout dimensions



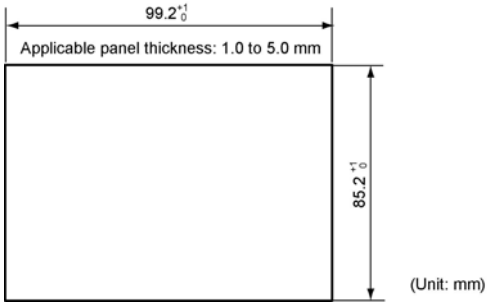
9.1.2 GT05



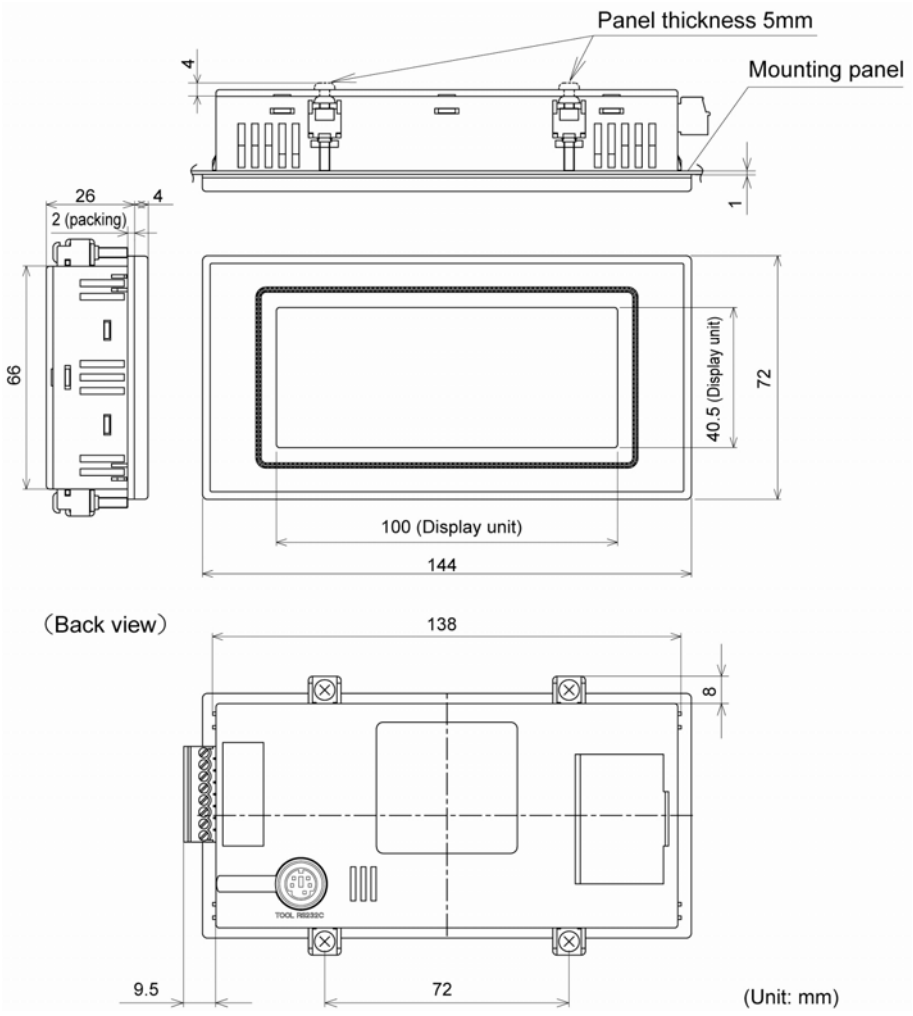
When installing cables



Panel cutout dimensions



9.1.3 GT11



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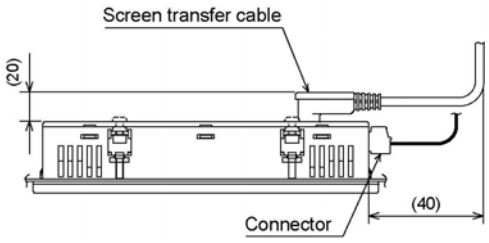
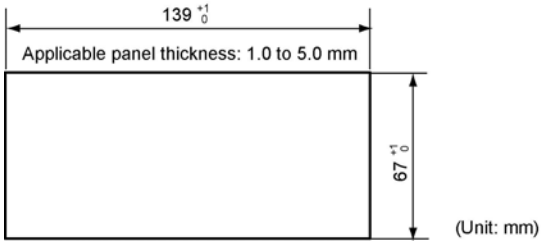
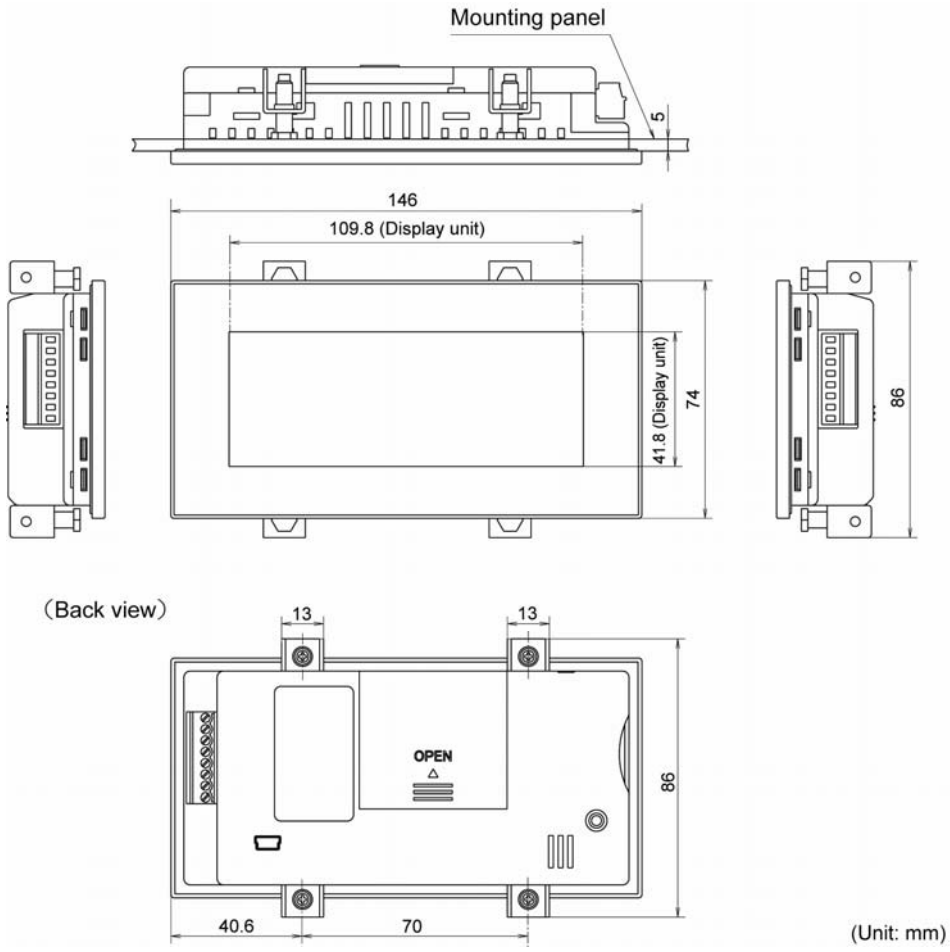


Panel cutout dimensions



9.1.4 GT12



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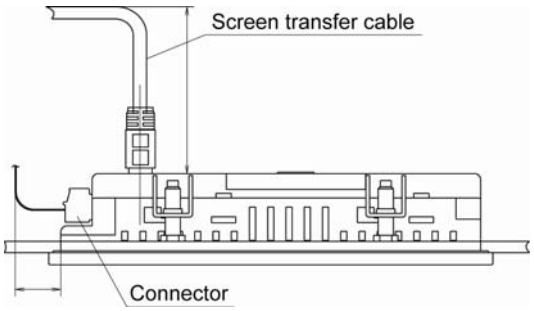
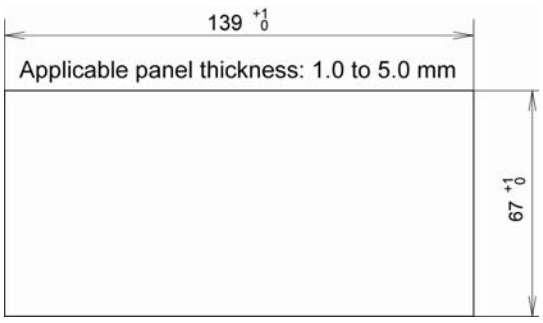
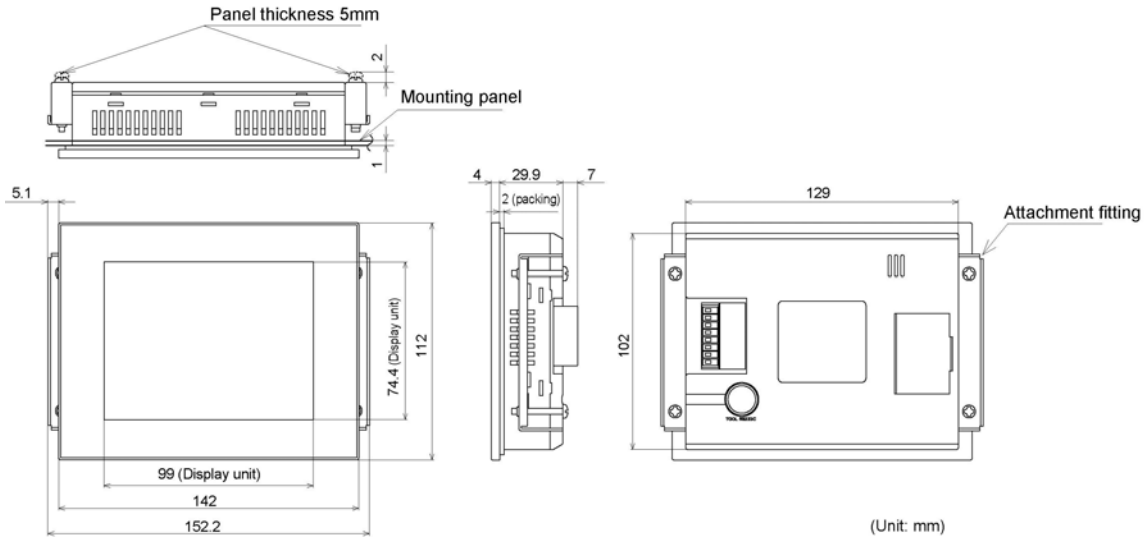


Panel cutout dimensions



9.1.5 GT21



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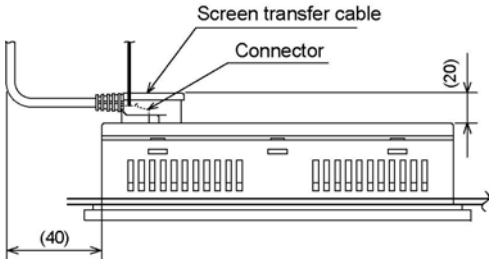
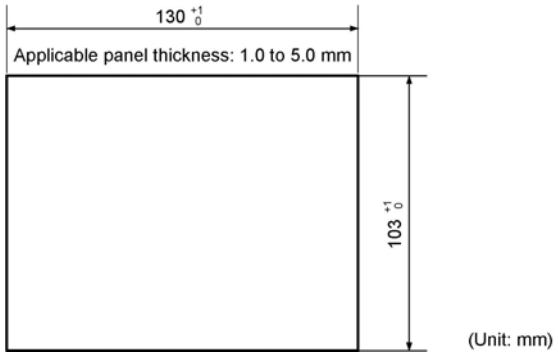
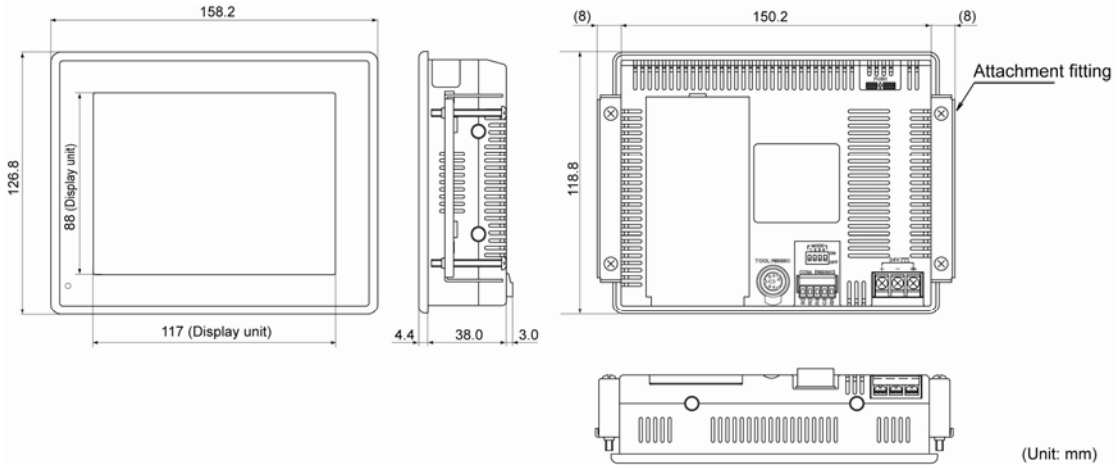


Panel cutout dimensions



9.1.6 GT30



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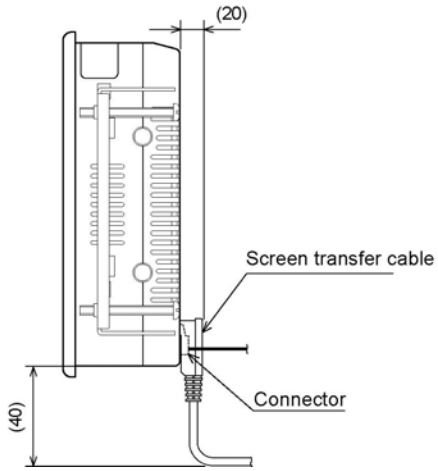
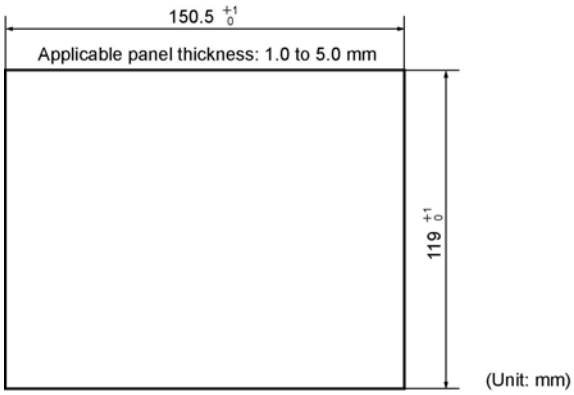
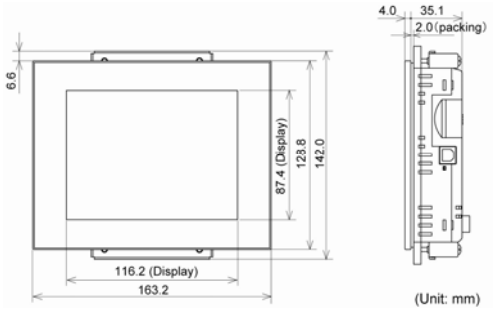


Panel cutout dimensions

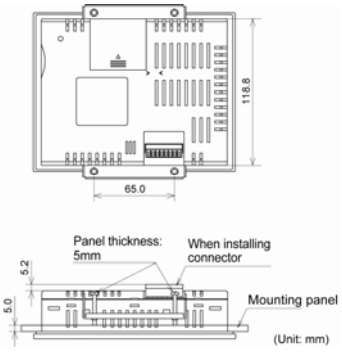


9.1.7 GT32

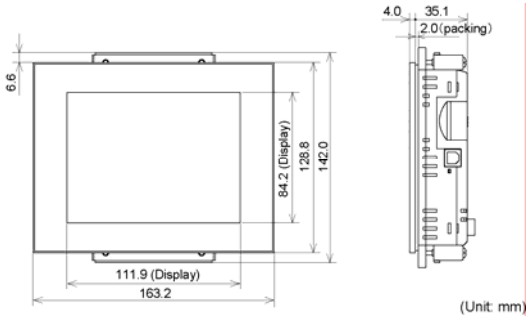
GT32M



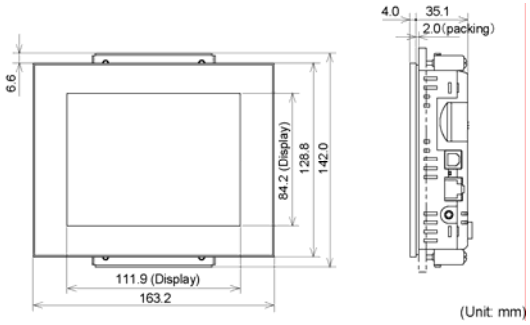
Back view



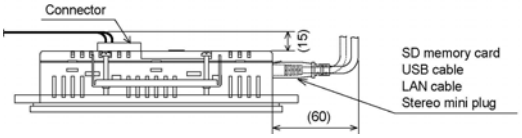
GT32T0



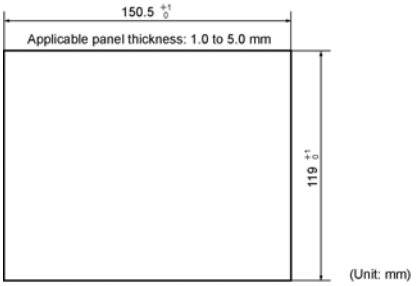
GT32T1



When installing cables



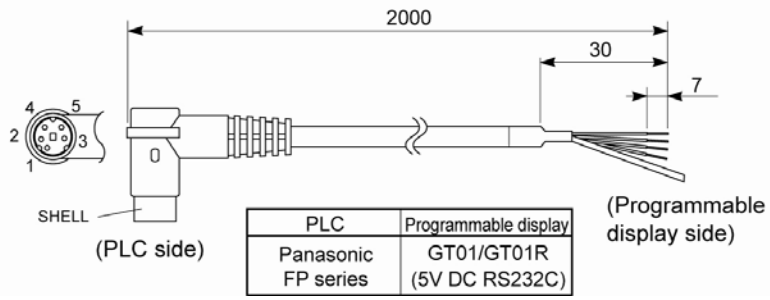
Panel cutout dimensions



9.2 Cable Specifications

9.2.1 AIGT8142

(Unit: mm) * Bundled with ferrite



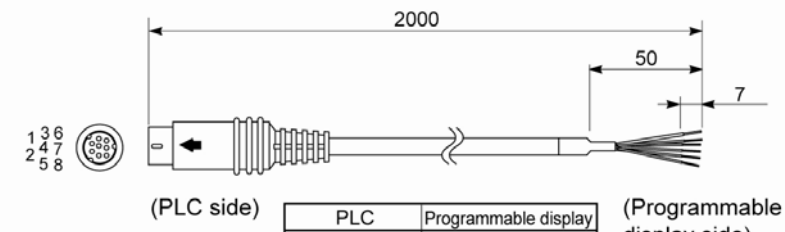
PLC	Programmable display
Panasonic FP series	GT01/GT01R (5V DC RS232C)

Mini-DIN plug side signals

Pin No.	Signal name	Wire color
1	SG	Brown
2	SD	Red
3	RD	Orange
4	–	–
5	+5V	White
–	SHELL	Black

9.2.2 AIGT8152

(Unit: mm) * Bundled with ferrite



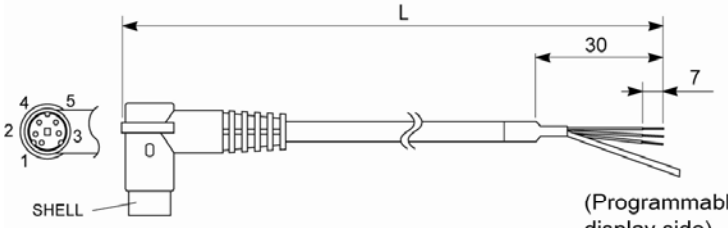
PLC	Programmable display
Mitsubishi FX series	GT01/GT01R 5V DC RS422/RS485

Mini-DIN plug side signals

Pin No.	Signal name	Wire color
1	-RD	Green
2	+RD	Yellow
3	SG	Brown
4	-SD	Orange
5	+5V	White
6	–	–
7	+SD	Red
8	–	–
–	SHELL	–

9.2.3 AIGT8162/AIGT8165/AIGT8160

(Unit: mm)



PLC	Programmable display
Panasonic FP series	GT series (24 V DC RS232C)

Mini-DIN plug side signals

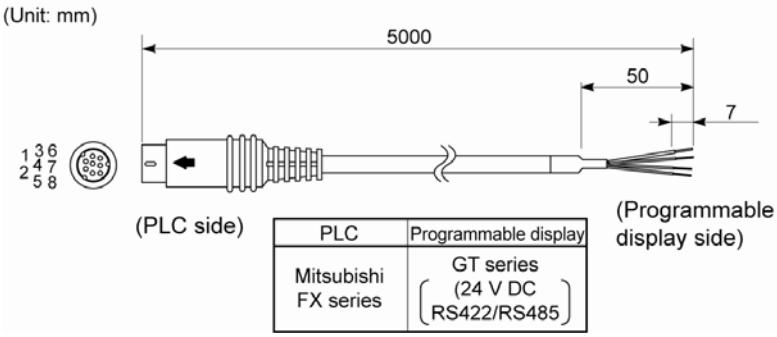
Pin No.	Signal name	Wire color
1	SG	Brown
2	SD	Red
3	RD	Orange
4	–	–
5	–	–
–	SHELL	Black

Model No.	L
AIGT8162	2000 mm
AIGT8192 *	
AIGT8165	5000 mm
AIGT8160	10000 mm

* AIGT8162 without shield (For GT30)

9.2.4 AIGT8175

(Unit: mm)



PLC	Programmable display
Mitsubishi FX series	GT series (24 V DC RS422/RS485)

Mini-DIN plug side signals

Pin No.	Signal name	Wire color
1	-RD	Green
2	+RD	Yellow
3	—	—
4	-SD	Orange
5	—	—
6	—	—
7	+SD	Red
8	—	—
—	SHELL	—

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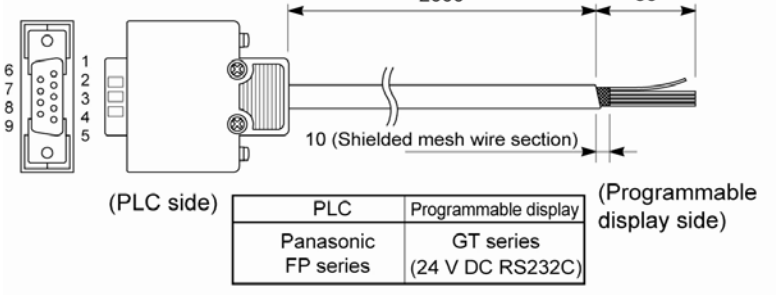
(Unit: mm)



PLC	Programmable display
Panasonic FP series	GT series (24 V DC RS232C)

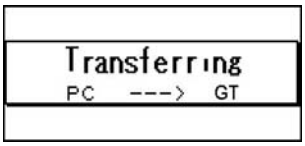
Signals on D-SUB side

Pin No.	Wire color (Dot mark)
1	Brown (Black dot)
2	Brown (Red dot)
3	Yellow (Black dot)
4	Yellow (Red dot)
5	Green (Black dot)
6	—
7	Green (Red dot)
8	—
9	—

9.3 Table of Screen Messages

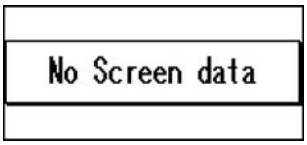
Table of GT screen messages
In addition to screen data, the GT also displays the following messages.

When transferring data from personal computer to a GT
This is displayed when data is being transferred from the computer to the GT.

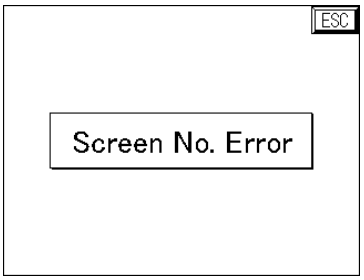


When transferring data from GT to a personal computer
This is displayed when data is being transferred from the GT to the computer.

When there is no base screen data
This is displayed when there is no base screen data. (It is displayed even if the configuration data has been sent.)

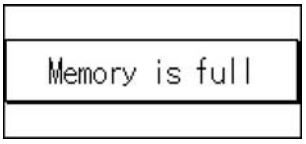


When the specified screen does not exist
This is displayed in cases such as when there is no data for a specified screen number.



"ESC" button is displayed at the top right of the screen to return to the previous screen.

When the screen memory is full
This is displayed if the internal user memory (F-ROM) is full.



9.4 BIN/HEX/BCD Code Correspondence Table

Decimal	Hexadecimal	Binary		Binary Coded Decimal			
0	0000	00000000	00000000	0000	0000	0000	0000
1	0001	00000000	00000001	0000	0000	0000	0001
2	0002	00000000	00000010	0000	0000	0000	0010
3	0003	00000000	00000011	0000	0000	0000	0011
4	0004	00000000	00000100	0000	0000	0000	0100
5	0005	00000000	00000101	0000	0000	0000	0101
6	0006	00000000	00000110	0000	0000	0000	0110
7	0007	00000000	00000111	0000	0000	0000	0111
8	0008	00000000	00001000	0000	0000	0000	1000
9	0009	00000000	00001001	0000	0000	0000	1001
10	000A	00000000	00001010	0000	0000	0001	0000
11	000B	00000000	00001011	0000	0000	0001	0001
12	000C	00000000	00001100	0000	0000	0001	0010
13	000D	00000000	00001101	0000	0000	0001	0011
14	000E	00000000	00001110	0000	0000	0001	0100
15	000F	00000000	00001111	0000	0000	0001	0101
16	0010	00000000	00010000	0000	0000	0001	0110
17	0011	00000000	00010001	0000	0000	0001	0111
18	0012	00000000	00010010	0000	0000	0001	1000
19	0013	00000000	00010011	0000	0000	0001	1001
20	0014	00000000	00010100	0000	0000	0010	0000
21	0015	00000000	00010101	0000	0000	0010	0001
22	0016	00000000	00010110	0000	0000	0010	0010
23	0017	00000000	00010111	0000	0000	0010	0011
24	0018	00000000	00011000	0000	0000	0010	0100
25	0019	00000000	00011001	0000	0000	0010	0101
26	001A	00000000	00011010	0000	0000	0010	0110
27	001B	00000000	00011011	0000	0000	0010	0111
28	001C	00000000	00011100	0000	0000	0010	1000
29	001D	00000000	00011101	0000	0000	0010	1001
30	001E	00000000	00011110	0000	0000	0011	0000
31	001F	00000000	00011111	0000	0000	0011	0001
63	003F	00000000	00111111	0000	0000	0110	0011
255	00FF	00000000	11111111	0000	0010	0101	0101
9999	270F	00100111	00001111	1001	1001	1001	1001

9.5 ASCII Code Table

b7	b6	b5	b4	b3	b2	b1	b0	R \ C	0	1	2	3	4	5	6	7
				0	0	0	0	0	NUL	DEL	SPACE	0	@	P	`	p
				0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q
				0	0	1	0	2	STX	DC2	"	2	B	R	b	r
				0	0	1	1	3	ETX	DC3	#	3	C	S	c	s
				0	1	0	0	4	EOT	DC4	$	4	D	T	d	t
				0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u
				0	1	1	0	6	ACK	SYN	&	6	F	V	f	v
				0	1	1	1	7	BEL	ETB	'	7	G	W	g	w
				1	0	0	0	8	BS	CAN	(	8	H	X	h	x
				1	0	0	1	9	HT	EM	)	9	I	Y	i	y
				1	0	1	0	A	LF	SUB	*	:	J	Z	j	z
				1	0	1	1	B	VT	ESC	+	;	K	[	k	{
				1	1	0	0	C	FF	FS	,	<	L	¥	l	|
				1	1	0	1	D	CR	GS	-	=	M	]	m	}
				1	1	1	0	E	SO	RS	.	>	N	^	n	~
				1	1	1	1	F	SI	US	/	?	O	_	o	DEL

Record of changes

Manual No.	Date	Desceiption of changes
ARCT1F398E	Nov.2004	First edition
ARCT1F398E-1	Jun.2005	2nd edition Additions: -GT01/GT11color LED Backlight Type (White) -Chapter 4 Connecting to the FP-X
ARCT1F398E-2	Dec.2005	3rd edition Additions: GT21
ARCT1F398E-3	Mar.2006	4th edition Additions: Functions such as Copy GT, etc. (PDF only)
ARCT1F398E-4	Jan.2007	5th edition Additions: GT32 GT01R
ARCT1F398E-5	Nov.2007	6th edition Additions: GT05
ARCT1F398E-6	Aug. 2008	7th edition
ARCT1F398E-7	Dec. 2008	8thedition - Change in Corporate name
ARCT1F398E-8	Jul.2009	9th edition Additions: GT12
ARCT1F398E-9	Sep.2009	10th edition

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